

# **An Examination of Selected Recent MMS Socioeconomic Studies and Assessments in the Gulf of Mexico**



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## **SECTION 1.0**

### **INTRODUCTION**

The Minerals Management Service (MMS) is the major mineral leasing agency of the Federal Government. Its Outer Continental Shelf (OCS) Gas and Oil leasing program has generated more than \$100 billion in revenue since 1954. Its OCS program is of major importance to the MMS and the nation.

In attempting to manage the nation's gas and oil resources, MMS has made extensive efforts to meet the needs of a wide variety of constituencies and to address the concerns of a similarly broad spectrum of local, state and national groups including those interested in the development of oil and gas resources, the preservation of such resources, and the environmental factors that may be impacted by their use. The Environmental Studies Program (ESP) was developed in 1973 as one means of obtaining additional research on key biological, physical and socioeconomic issues impacting energy resource development. It was to assist the agency in obtaining necessary information about the ecological, physical, oceanographic, and socioeconomic implications of energy development through the contracting of studies in a variety of physical, biological and socioeconomic areas. The ESP was mandated to address such human environment concerns as those noted in both the National Environmental Policy Act (NEPA) and the Outer Continental Shelf Lands Act (OCSLA).

The National Environmental Policy Act of 1970 clearly mandated socioeconomic analysis. For example, the act notes (National Environmental Policy Act, PL 91-190, 1970, p. 853) "The Congress, recognizing the profound impact of man's activity on the interrelations of all components of the natural environment, particularly the profound influences of population growth, high-density urbanization, industrial expansion, resource exploitation, and new and expanding technological advances and recognizing further the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man, declares that it is the continuing policy of the Federal Government, in cooperation with State and local governments, and other concerned public and private organizations, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic and other requirements of present and future generations of Americans." It goes on to note that to do this, procedures and perspectives must be employed that (p854) "utilize a systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences and the environmental design arts. . ."

Similarly, the Outer Continental Shelf Lands Act requires that attention be given to the human environment which is defined by the act as consisting of "the physical, social and economic components, conditions, and factors which interactively determine the state, condition, and quality of living conditions, employment, and health of those affected, directly or indirectly, by activities occurring on the Outer Continental Shelf" (43 U.S.C. &1331 (i)).

Finally it is clear that additional dimensions have become of increased importance due to public concern and administrative decisions. Thus, the need for assessing environmental justice

dimensions as established by Executive Order 12898 has further highlighted the importance of socioeconomic dimensions in governmental decision making.

Clearly then, socioeconomic analyses have become a central part of the mission of the Gulf of Mexico MMS Region.

Despite these mandates, it was not until the early 1990s that the Gulf of Mexico OCS Region began to contract a significant number of studies in the area of socioeconomic impacts. This set of studies has now come to comprise a substantial body of information. It has examined numerous socioeconomic issues and impacts affecting the Gulf of Mexico OCS region.

What has not been sufficiently evaluated, and is the focus of this report, is:

1. The extent to which recently completed studies have addressed the key socioeconomic dimensions related to OCS development in the Gulf of Mexico;
2. The quality of studies completed relative to conceptual, methodological and state-of-the-art criteria;
3. What additional studies should be completed to adequately address the socioeconomic impacts of offshore development under both existing and likely future market, technological, industry, and developmental conditions.

In this paper, we report on our examination of a selected set of socioeconomic studies in an attempt to address the three issues noted above. The studies examined were ones selected by the MMS Contracting Officers Technical Representatives (COTR) who are social scientists thoroughly familiar with socioeconomic analysis completed for the Gulf of Mexico and whose selection represented their expert view of which studies were appropriate for review as socioeconomic analyses. The studies selected for review are listed in Appendix A.

It is important to note that there are numerous ongoing studies that could not be reviewed here because final drafts of their reports were not available to the review team. The list of such studies is substantial and Appendix B provides a list of some of the most important of these. For example, it was not possible to review the OCS-Related Infrastructure study for the Gulf of Mexico that is collecting information on such facilities as terminals, waste facilities, ports, heliports, supply bases, shipyards, platform fabrication yards, repair/maintenance yards, pipe coating facilities, refineries, petrochemical plants, and gas processing plants in coastal areas in Texas, Louisiana, Mississippi, Alabama and Florida. It was also not possible to examine the Benefits and Burdens of OCS Deepwater Activities that is examining the effects of deepwater activities on selected community and local public institutions and dimensions including factors affecting population growth in frontier areas. The study (Assessing and Monitoring Labor Force Needs) which is assessing and monitoring labor needs in industry and is developing a methodology to gather reliable measures and information on activities, hiring and scheduling, purchasing, and contracting through longitudinal survey data could also not be reviewed. The extensive case study (Sustainable Socioeconomic Development in Oil and Gas Country) of Abbeville, Louisiana to examine factors that have been associated with reducing the volatility of the effects of oil and gas development was also not available for examination but promises both important substantive and methodological developments. Clearly, if such studies had been



completed and reviewed by us the conclusions of this examination may have been somewhat different.

The analysis, evaluations and recommendations presented represent the views of the authors and should be recognized as such. In addition, since this is a review of a designated set of studies, it must be recognized that it is neither comprehensive nor exhaustive but rather represents an attempt to evaluate the general nature of MMS socioeconomic analyses to date both in terms of content and quality. It is also important to note that the MMS studies program is only one of many inputs impacting EIS and other Gulf planning efforts. This examination is intended to be useful to MMS in future study planning efforts, in its design and completion of EIS analyses, and in determining the information likely to be of greatest utility to communities and individuals in areas impacted by OCS development.



## **SECTION 2.0**

### **CRITERIA FOR STUDY EVALUATIONS**

The evaluation of these studies was done in terms of how well they addressed the key dimensions of socioeconomic impacts, if they did so using methods and empirical processes generally accepted as reflecting the most accurate and useful methods available (referred to as state-of-the-art or SOA methods) and if they produced information likely to be useful to MMS and local decision-makers. Specifically then, we use the criteria noted below to examine:

1. The extent to which the materials/studies are inclusive/exclusive of key impact dimensions;
2. The appropriateness, application, and documentation of the methodologies used in the area of analysis under consideration in the study;
3. The quality of the work relative to the state-of-the-art in the area of impact assessment both conceptually and methodologically;
4. The likely utility of the work for communities' (residents and leaders) and MMS' managers and decision-makers;
5. Areas/issues meriting further examination.

#### **2.1 SOCIOECONOMIC IMPACTS**

We evaluate socioeconomic impact studies related to economic, demographic, public service, fiscal, and social impacts as delineated by Leistritz and Murdock (1981). This is admittedly only one such categorization scheme (see for example Gramling and Freudenburg 1992; Vanclay and Bronstein 1995; Porter and Fittipaldi 1998), but it provides a means of examining detailed aspects of the socioeconomic studies reviewed in this report. The description of the categorization scheme of Leistritz and Murdock (1981) is useful for examining both studies and environmental assessments. The categories it delineates and the items it notes as needing analyses in an assessment indicate areas in which socioeconomic studies should be completed and the methodologies it describes indicate methods that should be used in assessments.

Leistritz and Murdock (1981) delineate the five major types of impacts which they assert must be examined for different project phases and different levels of geographic aggregation. The project phases for which assessments are to be made generally include baseline, construction, operation, and post-operation phases. These are roughly equivalent to baseline, leasing, development, operation, and post-operation or decommissioning phases of OCS projects. The reason for examining these project phases lies in the fact that impacts can only be assessed relative to baseline change and that the levels of investment, types of employment, forms of impacts, and the extent of impacts vary by project phase.

The geographic levels for which Leistritz and Murdock recommend that assessments be completed include the state, development regions, counties, places (towns and cities), school districts, and other taxing jurisdictions. These levels are dictated by the fact that economic market areas tend to operate within broad regions while other impacts are also manifested in smaller geographical areas. Similarly, the areas for which impacts are to be assessed are

determined by the types of jurisdictions whose leaders must react to, and attempt to manage, socioeconomic impacts and whose actions can affect the distribution and extent of local-area impacts. These are clearly such governmental jurisdictions as the state, counties, places, school districts, and taxing jurisdictions.

The five types of impacts delineated by Leistritz and Murdock are economic, demographic, public service, fiscal, and social and cultural impacts. Included among the economic impacts are impacts on employment, income and business activity. Demographic impacts include those on the size, distribution, and composition of the population including workforce participation patterns, worker and population settlement and migration patterns, and demographic characteristics of new and long-time residents including household size, presence of other workers (other than the person directly linked to the project), age, gender, race/ethnic composition, and education and other socioeconomic characteristics.

Public service impacts include effects on the demand for service personnel, facilities and equipment relative to the supply of these factors for such services as education (primary, secondary and higher education); police, fire and emergency services; water, sewer and sanitation services; health services including personnel (e.g., doctors and nurses both general and specialized), specialized equipment (e.g., CAT scans, dialysis units) and facilities (e.g., hospitals and clinics); transportation services (highways, road and streets, rivers, canals, and other forms as appropriate); social services including impacts on the number of persons receiving TANF, Medicare, and Medicaid and the characteristics of service providers; criminal justice services including impacts on youth and adult facilities, probation and other personnel; recreational impacts including impacts on parks, playgrounds, and selected recreational activities; library services including new facilities, services and holdings required; housing including both public and private-sector housing demands and supplies; and other services specific to the impact area.

Fiscal impacts include effects on public costs by type of service (as noted above) and revenues by source (e.g., property tax, sales tax, special assessments, user fees), and the timing of such costs and revenues relative to other project impacts for key jurisdictions. These jurisdictions generally include the state (if state costs and revenues are impacted), county, place, school district, and special taxing jurisdictions in the impact area.

Social and cultural impacts include effects on social institutions (including families, the economy, religion, education, and government), impacts on social structures (social stratification and inequality) and specific social groups (e.g., youth, the elderly, long-time residents, new residents), and impacts on the attitudes, values and perceptions of new and long-time residents of various types.

These five categories of socioeconomic impacts are examined not only for project phases but, if a specific area (such as the Gulf of Mexico) is of interest, impacts across projects are often cumulated to determine cumulative and long-term impacts. This process is discussed further below.

## **2.2 THE IMPACT ASSESSMENT PROCESS**

The process of impact assessment, and the analyses of socioeconomic impacts in general, usually involve several major steps. Below we briefly review the assessment process describing key elements of the process and the standard (i.e., state-of-the-art methods) used at each stage. Although differences exist depending on the specific guidelines of the organization and/or agency doing the assessment, most National Environmental Policy Act guided assessments have evolved to have similar steps/stages (in addition to Leistritz and Murdock 1981, see Vanclay and Bronstein 1995 and Porter and Fittipaldi 1998). These stages commonly include: (1) determination of the impact area; (2) description of baseline characteristics (often including an assessment or “scoping” of impact area residents’ expectations and preferences related to development); (3) projections of baseline conditions; and (4) projections of project-related impacts. In general, baseline projections are projected for a time period from the most recent period for which historical data are available through the last year for which project-related impacts are projected. Project-related projections are usually made by individual year within key phases of the project (e.g., leasing, development, operation, and post-operation or decommissioning phases).

### **2.2.1 Determination of the Impacted Area**

The socioeconomic impact assessment area is often quite different than that used for assessing biological, physical or other similar forms of impacts. Whereas areas for other analysis are often clearly discernible by using the boundaries of ecosystem areas, clearly defined topographical areas, or other delineated geographical boundaries, socioeconomic impact areas are difficult to determine. As noted below, this may be especially difficult in regard to OCS developments. In general, socioeconomic impact areas are determined by two criteria, the areas where project-related expenditures are made and areas which serve as the residence areas for project-related workers. Information on the likely location of workers and expenditures is usually obtained from the companies developing the expected projects or from analysis of the patterns for similar projects previously developed in the area. Because both project-related workers and expenditures may be dispersed widely across geographic areas, analyses are usually required to identify areas where clusters of employment and expenditures are likely to be located. In all cases, because employment and expenditures seldom display discrete patterns, some judgment is usually involved. Despite a certain arbitrary aspect to the determination of impact areas, the identification of the impact area is critical to the assessment process. If such areas are under-bounded, one is likely to find that key impacts are missed while if such areas are over-bounded, one runs the risk of diluting the impacts and thereby suggesting that the impacts of a project are less consequential than they may prove to be. A critical part of any assessment related report is thus a description of the impact area and the rationale for its determination.

Once an overall impact area has been determined, it is critical to discern what subareas will be used for assessments. Counties and places are widely used as are taxing jurisdictions (for fiscal analysis). What is critical in most assessments is that the subareas for which analysis is to be completed be ones that are useful to decision-makers both in the agency making the development decision and local decision-makers who must manage the impacts.

### **2.2.2 Description of Baseline Conditions**

Having determined the impact area, the next stage in the assessment process is the description of baseline conditions. This involves collecting data including historical as well as quantitative and qualitative data on the characteristics of the impact area prior to development. This assessment process can be quite extensive and is often the longest part of a socioeconomic impact assessment document. The standard factors included in the description are those delineated above for each of the impact dimensions. In general, historical data for at least a decade preceding the current time period are provided and crucial trends are noted. The intent is to provide a comprehensive description of the nature of the impact area and of those parts of it that are likely to be most impacted by the positive and negative impacts of the proposed project.

### **2.2.3 Projection of Baseline Conditions**

This part of the assessment process consists of projecting major changes in the impact dimensions noted above that will occur even if the proposed project does not occur. This is critical, because even without the proposed project the impact area will change. In assessing impacts the key comparison is not how the area when impacted by the project will differ from the area prior to the project but how it will differ from the characteristics it will have during the time period in which the project would exist without the project's initiation. For example, many rural areas have had years of population decline such that baseline conditions are likely to continue such decline. The impacts of a project on the demographic characteristics of such an area may be simply to partially stem the decline rather than to lead to extensive growth relative to baseline levels. In general, the projection methods described below for impact projections are also used for the baseline projections. The state-of-the-art methods generally used include input-output models (such as IMPLAN) for economic assessments, cohort-component methods for demographic assessments, population-based ratios for service assessments, service and economic-based methods for fiscal assessments, and historical and observation-based and survey-based extrapolations for the social and cultural baseline projections. Although the baseline projections are often seen as easier to complete than project-related projections, their difficulty depends upon the nature of baseline socioeconomic change in the impact area. In areas that have been relatively stable or which have changed in a relatively constant manner over time such assessments may be relatively straightforward, although general societal changes may alter conditions in them in unforeseeable ways. In areas with a variety of socioeconomic changes taking place, such as many rapidly growing areas in rapidly developing regions, anticipating how they will change taking into account all factors, except the proposed project, may be very demanding and make baseline projections as subject to error (if not more so) than project-related projections.

### **2.2.4 Projections of Project-Related Impacts**

After determining the impact area (and subareas within it for analysis), collecting baseline (i.e., pre-leasing) data on the dimensions noted above, and projecting them under baseline conditions for the projection period for each of the five types of impacts noted above, a projection of project-related impacts is completed. Socioeconomic impact projections generally begin with data on project characteristics particularly project location, project expenditures by type, sector and location of the expenditures, and direct project-related employment (Leistritz

1995; 1998). If possible, such data are obtained for each year during the project's expected life. Using such base data and some form of economic model to project indirect and induced employment (multiplier) effects and expenditures, impacts on income, employment and business activity are projected. Project-related change in per capita and household income, employment demand by sector and project phase, and impacts on businesses by sector and project phase are then projected for each year for each geographical subarea and the impact area as a whole.

Demographic impacts are generally completed by projecting baseline populations forward over the projection period using some form of cohort-component model which projects change in population cohorts (cohorts being groups of people with similar characteristics such as age) using assumptions about the basic demographic processes of deaths and migration for existing cohorts, and about birth rates to determine beginning age cohorts (see also Becker 1995). To these projections of the population by age, sex, and race/ethnicity, labor force participation (or availability) rates are applied to produce projections of labor supply (usually for different types of employment or jobs such as construction, operational, etc.) and these are matched to the projections of labor demand from the economic model. The difference between labor supply and demand (again usually by type of employment) is then assumed to indicate whether new labor will migrate into or out of the impact area and household characteristics are applied to the in- or out-migrating workers to produce projections of population migration. The projections of in- or out-migration are then added to, or subtracted from, baseline migration levels (or if baseline is used as a type of employment, replace baseline migration to produce total migration estimates including baseline and project-related) and the model iterated for each year during the projection period. Additional spinoff projections may be made of households using household headship rates and school enrollment using enrollment rates.

In general, service-level impacts are projected by using population or household-related ratios of services per population-unit (such as 1,000 or 100,000 persons) or number of households and multiplying the ratios by the projected population and households. The differences in baseline (service-supply factors) and project-related projections (demands for services) can then be used to determine whether the project will accentuate already overburdened services or provide additional volume that may help underutilized services to be maintained.

Fiscal impacts involve projections of costs and revenues (Leistritz 1995; 1998). Cost projections are usually obtained by multiplying per capita (or unit) costs for the delivery of a service times the number of persons (or households or service units) to be served. Revenue projections usually utilize projections of taxes per unit of income and/or assessed value of property. The specific services for which costs will be assessed will be largely determined by those for which cost data can be determined and revenue types will be determined by the tax laws and structures of the impacted jurisdictions. Yearly projections of both revenues and costs are essential because of the potential problem of the timing of costs relative to revenues, that is costs often rise before revenues resulting from new populations or households. Jurisdiction-specific projections are important because of what is termed jurisdictional mismatch; that is, the fact that revenue increases may be concentrated in one jurisdiction (or jurisdictional level) while costs are concentrated in another. As for service projections, comparisons of baseline and project-related projections are useful in determining whether the project is likely to cost more (in public terms) than it creates in revenues (and where this may occur) and accentuate already

existing deficits or whether it may generate revenues that not only pay for project-related costs but lead to surpluses that may be used to improve government and service infrastructure.

Social and cultural impacts are generally projected by various forms of extrapolation from historical events or comparative areas (Taylor et al. 1998; Wilkinson 1998; Burdge and Vanclay 1995). For example, if the area has been shown historically to be socially very cohesive and to generally exclude newcomers from social groups, then potential conflicts may be projected to occur between new and long-time residents. If the area has successfully accommodated similar types of projects in the past, then its population may possess the experience base necessary to successfully accommodate the proposed project. If the impact area is similar to other areas that have been substantially disrupted by projects of the type and magnitude of the proposed project, similar difficulties may occur in the impact area. Projections in these areas are often qualitative rather than quantitative in nature. Social and cultural projections are often extremely challenging.

## **2.3 CHARACTERISTICS AND DIMENSIONS AFFECTING SOCIOECONOMIC IMPACTS AND THE ASSESSMENT CONTEXT**

The characteristics and dimensions of OCS development in the Gulf of Mexico provide unique challenges to the socioeconomic study assessment and analyses processes noted above. These factors both limit the types of analyses that can be completed and increase the difficulty entailed in completing such analyses. We believe it is essential to note these factors before presenting our evaluations of recent studies. These factors can be conveniently grouped into three categories: (1) aspects related to the nature of the petroleum industry; (2) aspects related to the Gulf of Mexico development context; and (3) aspects related to differences in institutional, demographic, social, and economic contexts.

### **2.3.1 Aspects Related to the Nature of the Petroleum Industry**

Several attributes of the oil industry affect socioeconomic analyses and assessments, whether these projects are offshore or onshore. Included among these are:

**Volatility** based on a volatile world oil market. The substantial price swings over the past 30 years have led to major ups and downs in industry activity, and these have occurred in both offshore and onshore producing areas. The oil industry has adjusted to the reality of price volatility through restructuring, joint venturing, and other risk reducing strategies (see Wallace et al. [2001b], among others). Areas affected by industry operations have little choice but to cope with the new reality because they have little ability to influence a course of events that is determined by global considerations.

**Many Actors.** In contrast to other types of development where the action is often controlled by one firm, or at most a handful of businesses, the oil patch involves literally “a cast of hundreds,” including majors, independents, and a host of subcontractors. For example, the industry includes fabricators and shipyards, marine shipping companies, aviation companies, diving companies, pipecoating companies, and a multitude of others. This makes it much harder to obtain accurate information about industry operations



(employment, expenditures, etc.), let alone intentions. It also makes it more difficult to establish effective monitoring and mitigation programs.

**Geographic Base.** Where the typical socioeconomic impact analysis can be conducted in a clearly delineated geographic area, this is not the case for OCS activity in the Gulf of Mexico. The area is vast extending from Texas to Florida and reflects extreme social, cultural, economic, and institutional variation.

**Lease-specific Sales vs. Cumulative Impacts.** Both offshore and onshore, it appears that individual leasing decisions seldom trigger socioeconomic effects of a magnitude to warrant a comprehensive socioeconomic assessment. Yet the sum of numerous decisions can lead to truly substantial cumulative effects. Further, sometimes a lease sale's primary socioeconomic effect may be to stabilize the status quo.

### 2.3.2 Aspects Related to the Gulf of Mexico Development Context

There also are some attributes of the situation in the Gulf of Mexico that affect the context for impact assessment, and some attributes of offshore development that are somewhat unique. These include:

**Established Industry.** The "classic" impact assessment situation has been one where a new activity (industry, project) is being imposed into an environment where this type of activity has not previously existed. However, the offshore petroleum industry has a long history in the Gulf of Mexico. A certain level of new leasing and development is required just to maintain current levels of industry production, employment, and population. The whole concept of what is "baseline" and what constitutes "impact" is difficult to establish and may need to be reconsidered.

**Translating Offshore Activity into Onshore Impacts: Establishing the Impact Area.** As the reviews of several of the MMS studies noted below suggest, offshore development activities can be serviced from a variety of onshore locations. Also, various phases of an offshore development may be serviced from different locations onshore (see, for example, Plater et al. 2000). Finally, the nature of offshore work schedules (7 on, 7 off, etc.) means that some offshore workers can live at substantial distances from their onshore staging areas. This often makes the process of delineating the impact area quite difficult and, as a result, many studies tend to examine impacts for areas that are "assumed" to be impacted.

### 2.3.3 Aspects Related to Differences in Institutional, Demographic, Social, and Economic Contexts

**Differences in Regulatory Environments.** Most impact assessments are made within a single area and nearly always within areas within a single state. Because Gulf of Mexico assessments often require multi-state analysis efforts, the impacts are obviously affected by vastly different state and other regulatory environments. The forms and types of state and agencies charged with regulating energy development, environmental regulations, service provision, and the types and forms of state and local tax structures, zoning regulations, etc. are likely to be much more varied than in other types of assessments and

are likely to confound the process of attributing impacts to OCS and other forms of development.

**Social, Demographic and Economic Contextual Differences.** The different states, coastal, non-coastal and other development contexts are also substantially different in demographic, social, economic, and other ways as well. Although numerous studies specifically attempt to describe such differences (see Wallace et al. 2001a; Austin et al. 2002; Seydlitz and Laska 1994), any attempt to assess impacts accurately cannot do so unless one knows not only that such differences may affect the impacts occurring in an area but also the nature, magnitude and duration of their effects on the magnitude and location of impacts. This latter type of knowledge has not been established and is likely to require basic research that has yet to be completed. The point is that as one attempts to assess impacts in multiple states, counties, and development areas across different industries involved in OCS activity, the difficulty entailed in accurate assessments is increased and the likelihood of misallocation of impacts is also increased. Attempts to obtain gulf-wide generalizations may therefore be extremely difficult.

It is clear, then, that such factors provide additional challenges to studying socioeconomic impacts in the Gulf of Mexico, especially when the effects of long-term multiple projects' cumulative impacts are being examined. Most assessment methods as described above utilize procedures that are project-specific and implicitly assume that project impacts are summative; that is, that the impacts of multiple projects can be largely determined by summing their impacts. Unfortunately, no clearly agreed upon standards have been developed for projecting the impacts of simultaneous or cumulative effects in the field of socioeconomic impact assessment.

## **SECTION 3.0**

### **A BRIEF OVERVIEW OF STUDIES EVALUATED IN THIS ANALYSIS**

Before beginning the evaluation of the studies examined relative to the different impact dimensions, we wish to provide a brief overview of the major studies reviewed. MMS sponsored studies examined in this assessment include those discussing the general substantive topics of:

1. The nature of the petroleum industry in general and the OCS industry in the Gulf of Mexico in particular;
2. The Gulf Coast study area – including its history, economic trends, demographic patterns, labor force, etc.;
3. Employment and expenditure studies;
4. Analyses of selected types of impacts (e.g., oil spills and recreational fishing);
5. Area-specific studies of socioeconomic impacts.

### **3.1 PETROLEUM INDUSTRY STUDIES**

Studies of the offshore petroleum industry which reveal important aspects of its evolution include those by Gramling (1995), Pulsipher et al. (1995), Wallace et al. (2001b), Pulsipher et al. (2001), Wade et al. (1999), and Austin et al. (2002).

The work by Gramling (1995) traces the development of the offshore oil industry in the U.S., and particularly in the Gulf Region. The author begins with the first over-water drilling for oil (in 1896 at Summerland, CA) and discusses key milestones in technological development that allowed offshore development to proceed. The advent of the submersible drilling barge in 1933 was one of the breakthroughs that allowed exploration and development to proceed in the shallow coastal waters and marshes of Louisiana, and others followed – including increasingly larger drilling rigs, the tungsten carbide bit, and the ability to lay underwater pipelines. Early in the development of coastal petroleum resources, it was necessary to solve problems associated with operation in remote locations where daily commuting was infeasible. The use of crew living quarters near the job site and division of work into concentrated work periods (1 week on, 1 week off) emerged early in the history of offshore development.

Following World War II, the oil industry rapidly moved farther offshore, with the first producing well on the OCS completed in 1947. The period from 1946 to 1953 was clouded by Federal-state disputes over ownership of the OCS resources. The author summarizes the key points at issue and the key provisions of the Outer Continental Shelf Lands Act of 1953 that effectively resolved them. Subsequently, development in the Gulf was rapid. By 1957, 100 offshore drilling rigs were operating in the Gulf, 96 of which were off Louisiana.

This report offers a very readable work on the history of OCS development in the Gulf Region, particularly Louisiana, up to 1995. It provides a very good historical background on the development of OCS activity (including state-federal legal conflicts over ownership) and discusses the Gulf OCS in the context of the global offshore industry. The discussion of offshore drilling technology (in terms understandable to non-engineers) is also very useful. The report includes summary statistics on the number of production platforms in the Gulf, number of tracts

leased, and population changes in coastal parishes. The author also provides some background on the development of OPEC and its role in the world oil economy. The report is a valuable reference for understanding the history of the industry and why/how it developed as it did.

Pulsipher et al. (1995) address the performance of major, integrated oil companies (majors) versus smaller companies (independents) in exploration and production (E & P) of hydrocarbons (oil and gas) from the Gulf OCS. The authors explore the hypothesis that a shift from the majors to independents will cause domestic oil and gas resources to be developed less aggressively and less efficiently. Key definitions incorporated in the analysis include:

1. **Majors** – integrated companies with more than 1 billion barrels of oil equivalent (BOE) in reserves, worldwide;
2. **Large independents** – firms listed in *the Oil and Gas Journal* (OGJ) list of the largest 100 firms, but not majors, with assets > \$500 million;
3. **Smaller independents** – OGJ list of top 300 firms, assets < \$500 million. This category also includes all privately held companies.

The authors examine drilling records in the Gulf OCS for the period 1983-1992, as well as the total exploration and development (E&D) expenditures by the different groups of companies. They find that both majors and larger independents have been increasing their foreign E&D activity. From 1987 to 1992, the majors' E&D spending on foreign prospects increased by 113 percent, while that of the independents grew by 73 percent. However, over the same period, domestic E&D expenditures by the majors declined by 34 percent while those of the independents grew by 12 percent. Thus, the majors' share of domestic E&D spending fell from 77 percent in 1987 to 66 percent in 1992. This shift is part of the reason for the concern about the relative performance of the two groups.

To assess their performance, the authors examine drilling records for the Gulf OCS for 1983-1992. Over this period, independent operators accounted for nearly 70 percent of exploratory wells drilled on the Gulf OCS, while the majors drilled 58 percent of the total development wells and 60 percent of successful development wells. However, if success is measured by barrels of oil equivalent added to reserves per foot of successful wells drilled, on average the independents were more successful than the majors, adding 265 BOE per successful well drilled (1983-92) compared to 227 BOE for the majors. Using total footage drilled as the measure, independents as a group still did slightly better with 111 BOE compared to 106 BOE for majors.

To summarize, in the Gulf OCS, independents have been more aggressive and successful than majors in exploration while the majors have been only moderately more successful in development drilling. In aggregate, the independents have done better. Thus, the authors conclude that there is little evidence to support the speculation that the Gulf OCS hydrocarbon resources would be less effectively developed should independents continue to play a larger role.

Wallace et al. (2001b) examine changes that have occurred in the U.S. oil and gas industry over the past 20 years, the major forces leading to those changes, and the principal effects of industry changes. The authors conducted an extensive review of publications from industry, government, and academic sources, supplemented by personal communication with

industry representatives. The discussion is organized around two major issues (oil and gas price changes and corporate organization and strategy) and four crosscutting topics (economics, technology, labor, and the regulatory environment). Major drivers of industry change identified in the study include increasing volatility of prices, rising costs of oil and gas projects, globalization of the industry, emphasis on shareholder value, the increasing role of technology, and concern for management of risk.

The industry is now a high tech, new economy, industry. With such changes it would be difficult to overstate the significance of finances and access to capital in the overall strategy that the industry now follows. This transition is not without important costs. For example, one consequence of the restructuring that has occurred over the past 20 years is a shortage of skilled personnel in virtually all aspects of the industry. The image of the industry has been impacted because of mass layoffs and loss of job security. As a result, current employees express far less loyalty to the companies than did the previous generation.

The study addresses the U.S. oil and gas industry overall, but with emphasis on OCS activity in the Gulf of Mexico (GOM). Volatility of product prices was found to be a major force affecting the industry; from 1980 to 2000, oil prices moved from a high of \$54.46 (in 2000 dollars) in 1981 to a low of \$11.26 in 1998. Prices of natural gas had similar fluctuations. The collapse of oil prices in the mid-1980s was a major factor leading to industry restructuring. Producers have consolidated, restructured, adopted cost-saving technologies, and implemented cost cutting efforts (such as downsizing and outsourcing).

These authors have produced a very thorough review of recent changes in the oil and gas industry, the forces leading to these changes, and their consequences. The study provides a helpful background and perspective on the industry that should be useful to anyone undertaking work on socioeconomic impacts of OCS development.

Pulsipher et al. (2001) undertook a rather specialized study to forecast the number of production platforms that will be operating on the Gulf of Mexico OCS to the year 2023. Econometric analysis using historical data (1947-1996) on structures and other factors is employed to estimate key relationships. Least squares regression is the specific estimation technique, although other alternatives were explored. Forecasting platform numbers also required forecasting the average wellhead price of oil, the number of wildcat (exploration) wells drilled, the number of new fields discovered, etc. U.S. Department of Energy (DOE) projections of future oil prices drive the projection model.

The model was found to explain nearly 80 percent of the variation of the historical values of the principal dependent variable (new offshore structures) and to track very closely with the historical trend of platform installations. The most likely (reference) scenario shows the number of operating offshore structures on the Gulf of Mexico OCS declining by about 29 percent over the period from 1999 to 2023. The decline occurs because the number of platforms being installed is predicted to increase only slightly over current levels while the number of platforms being removed is predicted to increase substantially.

The authors appear to have used appropriate data and estimation techniques, and the economic logic behind their model seems sound. However, econometric analysis using historical

data assumes that past relationships extend into the future. Although the authors did use accepted methods of testing for major changes in structure during the historical period, major future changes in technology, world markets, or other key forces could invalidate the results.

Austin and her colleagues (2002) discuss changes in the offshore oil industry from the perspective of employees and their families. Their report summarizes findings from a three-year ethnographic study focused on two communities (Morgan City and New Iberia) in southern Louisiana. The research team explored changes in the OCS oil and gas industry and how they are affecting workers, families, and communities. The research approach included placing two researchers in residence in the study communities. The interviews and observations by these individuals were supplemented by site visits conducted by eight additional researchers and also by interviews/discussions conducted by a number of local teachers who were recruited and trained by the project team. Throughout the effort, the team endeavored to triangulate by seeking information from persons with different points of view, different positions in social and economic hierarchies, different genders, ethnicities, etc.

The report is organized into two major chapters – one discussing impacts by sectors of OCS activity and a second addressing key issues affecting OCS workers, their families, and the communities affected by OCS activity. The six sub-sectors of OCS activity examined in the report represent the diversity of employment opportunities offered by the OCS industry in terms of stability/vulnerability of employment, patterns of work scheduling, and safety, among other factors. The researchers found that the sectors differ substantially along several dimensions; for example, drilling is very volatile in response to industry cycles, whereas production is more stable. However, some industry trends are affecting all sectors. One of these is the series of mergers and acquisitions that swept across the industry beginning in the 1980s. The effects of this restructuring of the industry have been many and varied, including (1) company headquarters and onshore supervisory personnel have been relocated from Morgan City and New Iberia to Houston and New Orleans, (2) more formalized hiring practices have enhanced opportunities for ethnic minorities and women and led to greater emphasis on formal qualifications, rather than on-the-job experience, (3) an industry shift toward contract labor has reduced workers' job security, (4) shifts from predictable work schedules (7-7, 14-14, etc) to on-call status and/or longer shifts place greater strain on workers and families, and (5) as a result, the OCS industry no longer can rely on a stable and loyal work force, at least not to the extent it could in the past.

Other changes occurring in the industry include (1) the pay differentials between oil industry work and jobs in other industries/occupations are much less now than in the 1970s, (2) work shifts are becoming longer and/or more uncertain in some OCS sectors (and today's worker and families may be less willing to accept these constraints), (3) the OCS industry has made major improvements in both environmental and worker safety, (4) increased diversity in the workplace has meant that workers may find themselves working with persons with different cultural backgrounds, and (5) industry cycles, together with company cost-cutting efforts, leave workers feeling much less secure in their jobs, with layoffs and demotions (bumpbacks) a real possibility.

Again, the primary focus of this work is on the effects of OCS activity on families. Particular attention is given to some of the challenges of raising families when one of the parents

(usually the father) spends so much time away. Depending on an individual's work schedule, a parent/spouse may be away from the family anywhere from seven days to nearly a month at a time. Various coping strategies must be learned to more effectively accommodate this work schedule. One strategy reviewed by the authors is the development of social networks. Families most affected by OCS work schedules often turn to other family members who have already experienced life in the oil and gas industry to learn effective coping skills. However, informal social networks are also developed.

The different generations within the communities most impacted by OCS activity expressed quite different opinions about working in the oil industry. Older generations generally see it as a decent way to make a living. Younger generations, however, are starting to look beyond the oil industry. These researchers found that many high school students are increasingly looking to higher education as a way to escape life in the oil field. Most students interviewed by the researchers indicated that they could see themselves working in oil for a short period of time in order to make some quick money, but after that, they hoped to move on to another career choice. Interestingly, although parents saw oil as a good career for themselves, they too hoped that their children would choose other career paths. Clearly, loyalty to OCS work has decreased in recent years, and this is driven in significant part by changes in the oil industry.

The final section of this report deals with the effects of OCS oil and gas activity on other social institutions. During boom periods, the population increases rapidly, increasing number of transients come into town, and housing shortages are experienced. During bust periods, unemployment increases and welfare services become over-taxed. The study also shows that institutions such as hospitals and schools have trouble attracting and retaining high-quality employees. Students have historically been trained for a life in the oil industry and often lack the training for other jobs. As stated earlier however, this is beginning to change as an increasing percentage of young people seek life outside the oil industry.

The second volume of the Austin et al. study basically constitutes a collection of case studies. The researchers tracked and studied various families, couples, and individuals to assess how their lives are affected by the oil industry. The first part of the report is basically historical. For example, it is noted that Iberia Parish was originally known for its production of sugar. Today there still exists a division between the "sugar elite" and the oil workers. Community residents less directly involved in the oil industry continue to reflect negative stereotypes about oil workers that include drunkenness, rowdy roughnecks, "loose wives," and divorce. Several respondents expressed concern about a perceived correlation between oil work and domestic violence. Although no empirical evidence was presented, the sheriff's department claims that there is a correlation. Law enforcement officials argue that lay-offs and down-times bring more drinking, fighting, and family dysfunction. In addition, when residents are working and the down-time is over, women are often forced to become both father and mother. The stress of the job schedule and the stress of uncertainty and instability contribute to excess levels of family-related problems. Despite this dysfunction, residents quickly point out the importance of family ties and community support in addressing the problems they face.

The second section of the report summarizes individual interviews. Residents discuss their struggles coping with difficult work schedules and an unstable work environment. Informal networks and support systems are once again brought up as an important coping strategy.

The third section discusses the differences in views between older and younger generations. The younger generation often sees town life as boring, and expresses the desire to move on. They admit that the money that can be earned working for the oil industry is attractive, yet not worth it. They feel that their work must also be interesting and challenging, and want more time with their families than their parents had. While the oil industry is not seen in these community case studies as solely negative, local sentiment toward the industry is clearly changing.

The fourth section deals with truck and boat transportation. Both of these sectors have undergone major changes in recent years. Deregulation of intrastate trucking in Louisiana has driven rates down substantially, so that oilfield trucking is no longer an attractive occupation. Further, this sector, long dominated by independent owner-operator truckers, has recently seen the rise of large trucking companies which have formed single source alliances with the major oil producer-customers. While the emerging structure appears to promote logistical efficiency (through consolidation of loads, better coordination of back hauls, and improved scheduling), it has greatly reduced the economic well-being of most truckers. Some feel that this is already being reflected in a lower quality labor pool for this sector. The offshore service vessel (OSV) sector has also been going through major changes, many stemming from increased emphasis on formal qualifications for licenses for captains and other personnel. Traditionally, training in this sector was conducted on the job through informal mentoring. As a result, mariners now face pressures to undertake extensive classroom instruction to qualify for licenses, and some observers believe the sector may face heavy losses of its most competent personnel.

Wade et al. (1999) provide a good overview of the recent history of coastal Alabama and the history of natural gas production in coastal Alabama, beginning with Mobil Oil Company's initial Mobile Bay state lease in 1969. The initial well was spudded in 1978 (after substantial regulatory delay), and gas was discovered in 1979 (at a depth of 21,000+ feet) in the Norphlet formation. This formation has become one of the most important U.S. natural gas producing regions.

The authors provide a detailed account of the progress of exploration and development activity and the numerous issues that arose during the process of obtaining permits for the initial exploratory wells. The report also provides background on Alabama petroleum geology and summarizes reserve information for federal and state waters. The ups and downs of the oil and gas market during the 1970s, 1980s, and 1990s and the effects of market volatility on exploration and development activity are examined. Detailed data are compiled on state and federal leasing activity, and on the state trust funds established from royalty payments received by the state.

The purpose of this report was to provide background for a subsequent analysis of the impacts of developing the Destin Dome OCS gas reserves (Plater et al. 2000). It serves this purpose very well and should prove valuable to anyone studying the effects of OCS development in this area.



### **3.2 STUDY AREA CONTEXT-HISTORY, SOCIOECONOMIC TRENDS, AND CURRENT ISSUES**

Studies that provide particularly useful background on the Gulf Coast region or portions thereof include Wallace et al. (2001a), Gramling et al. (1995), Blanchard (1999), and Kelley (1999).

Wallace and her colleagues (2001a) undertook an extensive overview of historical, social, and economic impacts of OCS development on Gulf Coast communities. These authors focus on three coastal areas (South Louisiana, Coastal Bend of Texas, and Mobile Bay, Alabama) but also provide considerable information about the Gulf Coast region generally. The study areas were selected through a two-stage process involving cluster analysis to identify groups of similar counties/parishes based on 1990 data for 611 variables. Then, expert opinion was used to select areas for case studies.

The study was based on ethnographic field work conducted in each study area during 1997 and 1998. The field work involved interviews with a cross-section of key informants, together with documents and data gathered from agency offices, libraries, and archives. The study focused on three key issues: (1) demographic and economic change in each area, (2) the historical fabric or landscapes of the communities, and (3) work and education. This report is the second part of a two-phase project to provide a baseline of social and economic change in Gulf Coast communities and the role of OCS development in those changes. Phase I produced an extensive database for the period 1930-1990 for 500 counties in the five Gulf Coast states.

The first major section of their report provides an historical overview of the Gulf Coast region since 1865. This review provides a very useful description on the development of the region and the role of the oil industry in that development. The next section discusses the development of the OCS oil and gas industry in the Gulf of Mexico. The authors summarize oil and gas production and price changes since the 1950s, with emphasis on the “boom” of the 1970s and early 1980s, the ensuing “bust” that lasted until about 1990, and the recovery of the industry since that time. This overview of the industry is very helpful in understanding the community socioeconomic effects that are examined subsequently.

The report next provides an overview of economic and demographic trends in the three study areas, as well as socioeconomic changes occurring in the Gulf Coast region generally since 1930. The influence of federal policies in transforming the region’s agriculture, stimulating its industry, and developing its infrastructure is emphasized, as is the region’s history of racial/ethnic diversity and disparity. Data on key socioeconomic indicators are summarized for each study area for the period since 1930 with more detailed data available since 1970. These data are useful in understanding the nature of the five parishes/counties and the changes that have occurred during the OCS development period. Changes in the study areas are compared with changes occurring in the respective states, and in some cases nationally.

The report's fifth section summarizes a statistical analysis of selected social and economic indicators for the study areas and their relationship to indicators of OCS oil and gas activity. The major findings include:

- ? The influence of OCS activity has been greater for the South Louisiana and Texas (San Patricio Co.) study areas than for the Mobile Bay area.
- ? Statistical trends in the study areas' social and economic indicators closely followed changes in the values of the same variables at the national level.
- ? There was widespread instability in the relationships between social and economic indicators and OCS oil and gas activities, with the most significant instability occurring between 1969 and 1995.
- ? There was no single indicator (e.g., OCS oil or gas sales volume, real price, or sales value) that adequately captures/represents the OCS oil and gas activities.

In concluding this section, the authors discuss limitations of the statistical analysis. Some of these include:

- ? All analyses were bivariate.
- ? Social and economic variables were measured at the county or parish level, which could mask community-level changes.

In addressing landscapes of the Gulf of Mexico, the authors focus on five aspects: agriculture, maritime, industrial, military, and leisure activity. The agricultural discussion focuses on the Louisiana sugar industry, which has been an important force in Lafourche and Terrebonne parishes. The mechanization of the industry over the years has had major implications for local workers, while the key role of federal farm policy leads to uncertainty for the future. In the Texas study area, agriculture once was based on vegetables and cotton, both of which were heavily dependent on Hispanic labor. Wages and working/living conditions for these workers became an issue, which in turn may have speeded the mechanization of the area's agriculture.

The maritime landscape discussion deals with the long-time dependence of South Louisiana residents on the sea, first for fishing and later in OCS support activities. Over time, sport fishing has grown, and some study area individuals have become fishing guides.

Discussion of the industrial landscape begins with a recap of economic development efforts in the Gulf Coast states dating back to the 1930s. Industrial recruitment became an organized state activity, with recruiters citing low cost (but unskilled) labor, low taxes, and few regulations as inducements. World War II provided a major stimulus to ship building, refineries, and petrochemicals. The growth of the manufacturing sector provided opportunities for labor being released from the agricultural sector by mechanization. Over time, the three study areas have developed substantial industrial bases, some of which is related to OCS activity.

The military landscape has long been important in the Gulf Coast region and currently is important to both the Coastal Bend, Texas and Mobile Bay, Alabama study areas. The authors discuss the development of a Navy Homeport in the Corpus Christi area over the past two decades.

The leisure landscape also has been a key factor in development of some parts of the Gulf Coast area. The authors discuss the Grand Isle area of Louisiana and Gulf Shores, Alabama in this context. Grand Isle was an early resort area, while Gulf Shores has developed as a resort and retirement area in recent years. The relationship between leisure interests and OCS is discussed, with concerns about pollution or visual impairment sometimes leading to OCS opposition from leisure interests while recreational fishermen flock to the offshore rigs.

The effects of OCS activity on occupation and education are the focus of the last major chapter. The authors examine these effects in the context of six study area communities. They also discuss the racial and ethnic aspects of education in the region. The legacy of past educational decisions has been a population that lags other parts of the nation in educational attainment. Currently, schools and students face choices as regards college prep curricula vs. vocational education to prepare students for jobs in the region's major industries (such as the oil industry). Changes in industry expectations also affect the educational system. Until recently, the OCS industry provided job opportunities for young men even though they had not completed high school. However, today's industry is placing more emphasis on education and certification. In addition, lack of formal education has hampered oil workers' ability to find alternative employment during downturns in OCS activity.

The recent resurgence of the OCS industry has led to renewed interest in finding qualified workers. Foreign workers (including Hispanics and Asians) have been recruited to fill some jobs. Study area schools are attempting to address these needs through school to work programs. Both school systems and employers also express concerns about the quality of students/workers, in terms of motivation, and work ethic.

This report is a truly massive work (489 pages, single spaced, plus appendix), and it incorporates a variety of issues and approaches. The discussions of the history of the region and the study areas provide a background that should be useful to anyone undertaking socioeconomic impact assessment work in the region. The comparison of the three study areas also should alert readers to the diversity of the Gulf Coast, not only in terms of the local demographics and economy but also in the nature of each community's involvement with the oil industry. The statistical analysis of relationships between social and economic indicators and indicators of OCS activity was perhaps the least useful section of the report. The major conclusion appeared to be that simple bivariate regressions did not perform well in explaining changes in local social and economic indicators. However, this study can be very useful as background on the Gulf Coast region, the changes that have occurred, and the role of OCS in these changes. The discussion of the development of the region and the industry are particularly useful in helping understand the background for the current situation.

McKenzie et al. (1993) assessed socioeconomic impacts of declining OCS activity on the Gulf Coast. The study area included 49 counties and parishes along the Gulf Coast from Brownsville to Mobile. Data are presented for 1960, 1970, 1980 (reflecting baseline conditions) and annually for 1981-86 (to show the period of decline or bust). The authors describe baseline changes for the period 1960-1980 at the level of 6 coastal (multi-county) areas. The whole coastal region experienced growth during the 1970s, and all six coastal areas registered net immigration during this period. Although mining industry jobs accounted for only 4.9 percent of regional employment (189,000 jobs) in 1980, mining industry jobs had increased 126% from

1970 to 1980. Highest percentage growth was in area C4 (Alabama-Mississippi) while the Houston area registered 180% growth (from 35,124 to 98,529 jobs) and had the largest absolute increase.

The authors describe the decline of the industry from 1981 to 1986 (as prices fell from \$31.77 per barrel to \$12.45 per barrel). The major price drop was from 1985 (\$24.08) to 1986 (\$12.45). Exploratory drilling on the OCS increased to 1984, then dropped sharply from 1985 to 1986. Net migration for the coastal region overall (i.e., 49 counties) turned negative between 1983 and 1984, while total employment fell 3.1 percent from 1982 to 1986. Also between 1982 and 1986, the mining sector lost 28.6 percent of its jobs, manufacturing 25.2%, and construction 20.1%.

One objective of the study was to examine the industry decline of the 1980s as a guide to the effects likely to be associated with a longer term decline associated with resource depletion. However, this section of the report is dominated by a cursory review of the “boomtown” literature associated with western energy development.

The final section of the report uses stepwise regression to derive models relating indicators of oil and gas activity to various socioeconomic variables. The database apparently is county/parish data for 1960, 1970, 1980, and 1981-86. Initial estimation efforts were not very fruitful, and so the study area was redefined to eliminate 13 counties/parishes that had relatively little involvement with OCS activity. Ultimately, the authors conclude that “no theoretically meaningful models relating OCS oil and gas activities to socioeconomic conditions are possible.”

Overall, this study was rather disappointing. First, although published in 1993, it used data only through 1986. It would seem that several more years of data should have been available, which might have strengthened the study. Second, the regression analysis was a major concern as the various statistical problems often encountered when using time-series (or pooled time-series, cross-section) data were not even mentioned (except for some discussion of multicollinearity). These problems include heteroscedasticity and autocorrelation, each of which can be tested for and potentially corrected for. The authors seem unaware of these issues. Nor did they seem to consider the possibility of lag effects (i.e., increased exploratory drilling activity in year  $t$  may have its greatest effects on area income or population in subsequent years [ $t + 1$ ,  $t + 2$ , etc.]). Finally, in discussing the effects of the bust, the authors comment that the 1980s bust period was also a period of recession in the national economy. However, although the regression-econometric model framework provides a vehicle for explicitly considering such effects, the authors apparently never attempted to do so.

Gramling et al. (1995), Kelley (1999) and Blanchard (1999) conducted issue analyses for the Central, Western and Eastern Gulf, respectively. In the Central Gulf of Mexico (Louisiana, Mississippi, and Alabama), the study team selected study communities in the three states (Cameron, Morgan City, Grand Isle, and Lafayette, Louisiana; Gulfport, Biloxi, and Pascagoula, Mississippi; and Mobile, Dauphin Island, Gulf Shores, and Fairhope, Alabama). Snowball sampling was used to select informants for the interviews. A total of 131 interviews were conducted. The main issues identified were (1) positive economic impacts, (2) negative economic impacts (especially potential damage to tourism by an oil spill), (3) positive

environmental impacts (rigs to reefs), (4) negative environmental impacts (damage to wetlands, trash on bottom, etc.), (5) aesthetics, (6) social impacts (over adaptation, boom-bust), and (7) policy issues (too much regulation vs. the need for careful regulation). The various study areas had major differences in the salience attached to various issues. The approach used seems very reasonable. Communities were selected to reflect different types and levels of involvement with OCS development. The research methods used and results obtained are described clearly.

In the Eastern Gulf of Mexico (Florida plus Baldwin Co., Alabama), Blanchard (1999) focused on organizations (environmental groups, Chambers of Commerce, oil and gas development companies, etc.) rather than individuals. Focus groups of interested parties (stakeholders) were convened at five locations. Subsequent telephone interviews (with snowball sampling) were utilized to complete the study in other areas. The stakeholders seemed most interested in expressing opposition (or support) to OCS development per se, rather than discussing specific concerns. Nevertheless, the author was able to identify differences among areas in the intensity of opposition.

The focus of Kelley's (1999) analysis is on the social, economic, and environmental issues relating to the oil and gas industry in five counties located on or near the Gulf of Mexico in southeast Texas. The primary goal of the project is to identify major issues and concerns of stakeholder groups in the region. The study was conducted at a time when recovery from the mid-80's downturn of the industry was well underway in most of the coastal communities of Texas that had been most heavily impacted by the widespread unemployment and collapse of social and economic infrastructure that had resulted from the "bust" in the oil and gas industry in the Gulf.

In response to the downturn, many communities in the study counties had made major efforts to diversify economically (Houston and Corpus Christi), while others had mostly abandoned prior direct investment in the oil and gas industry. Yet other communities, however, remain heavily dependent on the industry and were attempting to "ride out the hard times."

The methodology of the study is qualitative. Subjective perceptions of community leaders in business, government, and environmental organizations were assessed in face-to-face interviews. A total of 39 semi-structured discussions were conducted with individuals from these three general categories over the course of the study. Five general topical areas were covered in the discussions: degree of dependence on the oil and gas industry; perceived benefits to the community from the industry; local concerns about the strong presence of this industry; general perceptions about the industry; and the role of the federal government.

The primary perceived benefit from the industry is employment—the availability of jobs that are relatively high-paying. The primary concern expressed by the stakeholder groups is potential threat to the environment—spills, leaks, disposal of toxic materials, pipeline accidents, and so on. Another important concern was the perceived vulnerability of local communities because of their high level of dependence on a very volatile industry. Many respondents felt that the federal government should play a central role in policing the industry and assuring environmental safety. Yet, interestingly, very few of those interviewed had ever heard of MMS, or were familiar with what MMS does in the region.

Overall, this report provides a readable summary of issues identified by key stakeholder groups. It is extremely limited in focus, however. The study area includes semi-structured “interviews” with only 39 respondents from just five Texas counties. The issues identified are those one would expect—area residents recognize, and are concerned about, their dependence on the Gulf oil and gas industry. They fear the potential of environmental damage, and they would like to see their local economies continue to diversity.

While we note that historical analysis is certainly an on-going effort, we also would like to acknowledge that these first two categories of studies — those dealing with the oil industry in the Gulf of Mexico, and those dealing with the area context — represent a relatively high level of maturity. We will have more to say about context. However, here it is important to acknowledge that while there will need to be on-going refinements and updates, the “history” of oil development in the Gulf, at least at a level of sophistication that meets the needs of EIS and related work, is now quite fully developed. The work of Wallace (2001b) and Gramling (1995), in particular, provide important historical context for the offshore development of the oil and gas industry.

### **3.3 OCS EMPLOYMENT AND EXPENDITURE STUDIES**

The first effort to estimate the direct economic effects of Gulf of Mexico OCS activities was conducted by Centaur Associates, Inc. (1986). Data were gathered for the year 1984 to measure the direct primary effect of OCS production (measured by employment, payroll, and expenditures for goods and services by offshore producers), the secondary direct effect that results from purchase of inputs by the primary producers, and the secondary direct effect associated with handling, processing, and refining offshore oil and gas. Nine offshore producers provided detailed employee and expenditure data for the study. Information on employment and expenditures was obtained for 1984 and employee residence data (home zip code) as of Dec. 31, 1984. The data from the nine cooperating companies were later scaled to represent the total industry (scale based on oil/gas production data was 1.9937, which indicates the sample companies accounted for slightly over 50% of industry production).

The study results provide an excellent snapshot of the offshore industry. In 1984, the industry accounted for 142,860 person years of employment, consisting of:

Producer headquarters personnel	9,433
Producer staging area personnel	4,540
Producer personnel on platforms	9,224
Producer personnel on vessels	705
Gas processing plant personnel	11,006
Oil refinery personnel	10,556
Contractors and suppliers	97,396

Estimates of payrolls and expenditures for various industry components are also provided, as is information on residence of offshore workers. Louisiana was the place of residence of 19,680 of the total 23,902 workers, or 82 percent. Residences of workers are listed by parish and county.

Information from about 50 offshore contractors allowed the researchers to compute key impact ratios, such as payrolls as a percent of revenues, revenues per employee, payroll per employee, and percent of employees working offshore. These ratios were computed for the key industry segments (e.g., air transportation; boat, barge, and marine equipment; contract exploratory drilling). Multiplying the offshore producers' expenditures by each service component gave estimates of their payroll, employees, and other expenditures (based on the ratios discussed earlier).

Dismukes and his colleagues (2001) attempted to develop a better basis for assessing economic impacts of OCS development. Input-output analysis (IMPLAN) is the major modeling method utilized. The input-output (I-O) model is incorporated into a Social Accounting Matrix (SAM) framework. A major project activity was defining offshore expenditure profiles, by activity phase and water depth, which could then feed into the I-O framework. Allocation formats were developed to allocate the offshore expenditures to coastal areas around the Gulf of Mexico. The model is demonstrated by estimating economic impacts of anticipated OCS activity for three coastal regions of Louisiana.

Data collection was constrained by an OMB prohibition on surveys. The authors had to rely on published sources plus very limited contacts with firms/industry experts. In addition, engineering cost estimation software (FieldplanPro) was used extensively. The authors were creative in using the information available to them, but the data collection constraints were extensive.

Expenditure profiles were developed for all phases of OCS activity, from exploratory drilling to platform removal and abandonment, including work over and oil spills. For each of the phases, expenditure profiles were developed for four water depths: 0-60 meters, 60-200 meters, 200-900 meters, and >900 meters. The data bases developed will support analysis of economic impacts at the level of the multi-county coastal areas (10 areas surrounding the Gulf).

Allocation of offshore expenditures to the 10 coastal areas was based on a recent survey of offshore support businesses by the Louisiana Mid-Continent Oil & Gas Association. The survey results identified the companies and their types of activity. Activity type was used to categorize firms into IMPLAN sectors. This became the basis for allocating the expenditures for each phase of OCS activity and each water depth. (It is not clear whether they used the number of firms, the number of employees, or some other attribute to make the allocations. However, the same percentages were used to allocate expenditures from a given sector regardless of activity phase or water depth. The discussion of the regional allocations was not sufficiently detailed.)

Plater et al. (2000) estimate the economic impacts of coastal Alabama and Destin Dome natural gas development. Impacts are estimated for three regions (Mobile County, the rest of Alabama, and Texas/Louisiana). The impacts are estimated from the beginning of development activities in the early 1980s and projected through 2020. The three different impact areas (Mobile Co., rest of Alabama, and Texas/Louisiana) are affected differently by the coastal Alabama development. Mobile Co. receives a large share of expenditures from on-going production, a small share of exploration and development, and is the site of several gas processing plants. The rest of Alabama is affected primarily by the lease bonuses, royalties, and

other revenues it receives, which through a trust fund, support state expenditures of \$150+ million annually. Texas and Louisiana receive a major share (85%) of expenditures for exploration and development drilling and for platform construction and of pipeline contracting outlays (90%).

The IMPLAN model is used to estimate economic impacts, but the authors recalibrated the model to reflect production conditions in Alabama. Data from previous studies by Centaur Associates, Inc. (1986) and DRI served as a starting point to define expenditure patterns for various project phases. Information from local industry officials was used to modify the basic data to reflect major differences between Coastal Alabama operations compared to typical Gulf of Mexico operations. These officials also helped estimate what percentage of expenditures went to Mobile Co. (vs. Texas/Louisiana). The resulting projections show economic impacts to 2020 and the portions attributable to production from (1) Alabama state waters, (2) Mobile OCS, and (3) Destin Dome OCS.

Considering this area overall, the Centaur Associates, Inc. (1986) study was a landmark effort. The ongoing challenge appears to be how to keep this type of information current. Relative to methods used in such assessments, all recent MMS Gulf of Mexico economic impact studies that we reviewed used the IMPLAN model. This model has become the standard in economic impact assessment because it is generally viewed as providing acceptable accuracy/reliability at a reasonable cost.

### **3.4 ANALYSES OF SELECTED TYPES OF IMPACTS**

Socioeconomic studies of OCS development in the Gulf of Mexico have also examined several key areas of concern. Works by Pulsipher et al. (1999) on oil spill impacts and by Hiatt and Milon (2001) on recreational fishery impacts exemplify such studies.

The possibility of oil spills and the potential for a spill to degrade marine resources and inhibit recreation and tourism have long been a concern associated with offshore petroleum development. Pulsipher et al. (1999) examined the social and economic impacts of a 5,000 barrel oil spill that occurred just offshore in the Lake Barre region of the Louisiana coast in May 1997. Based on interviews and information obtained from Texaco (responsible for cleanup), the cleanup contractors, and local area officials, business owners, and residents, the short-term social and economic effects were quite small. Of the \$9.8 million spent by Texaco to clean up the spill (which came from a ruptured pipeline), 60 to 70 percent went to entities outside the three-parish local impact area. Few workers were hired locally because clean-up workers must be trained and certified. Local expenditures thus were largely for food and lodging for temporary workers. Interviews with 27 local informants (officials, business owners, etc.) revealed that 20 percent were not even aware that a spill had occurred. Positive impacts were seen to include spending by the clean-up crews, particularly in motels and cafes. The major negative effect was a concern about long-term impacts on marine resources (shrimp, oysters, and fish), but there was no local consensus about whether such effects had occurred.

One of the positive externalities of OCS development is its effects on recreational fishing -- sport fishermen flock to the offshore structures. Hiatt and Milon (2001) estimated demand, expenditures, and economic impact associated with recreational fishing and diving near offshore



Gulf of Mexico oil and gas structures and artificial reefs created from such structures. Data came from surveys of fishermen and divers from Gulf Coast areas of Alabama, Mississippi, Louisiana, and Texas conducted in 1999. Samples of fishermen using private, charter, and party boats, as well as divers, were interviewed in the field. A subsample from each group received follow-up telephone interviews to obtain expenditure data. The survey data were combined with information from regional surveys of fishermen to generate state and regional estimates of aggregate expenditures. The expenditure data were applied to the IMPLAN model to estimate regional economic impacts.

To expand the results from the sample to an estimate of impacts for the region, the authors relied on information from an annual survey conducted by the National Marine Fisheries Service. Their resulting estimates were that \$324.6 million in economic activity and 5,560 full-time equivalent (FTE) jobs in coastal counties of the Gulf Region resulted annually from fishing and diving activities near oil and gas structures.

This study addresses an important issue. The approach and methods seem to be state-of-the-art, and the results are presented in a very clear, readable manner. The importance of the results to policy makers is made clear in the report.

### **3.5 AREA-SPECIFIC STUDIES OF SOCIOECONOMIC IMPACTS**

Most of the socioeconomic impact analyses in recent EIS documents appear to be performed at the level of multicounty subareas representing Labor Market Areas (LMAs). This appears appropriate given the challenges of relating offshore activity to specific onshore localities but limits their utility for local-area decision makers. However, some strategically sited communities have received substantial impacts as a result of the recent resurgence of OCS activity. One of these is Port Fourchon in Lafourche Parish, Louisiana which has a strategic location (it is the only major Louisiana port located directly on the Gulf and only LA-1 provides surface access to Port Fourchon) and has become an important supply base for OCS activity. OCS-related employment grew rapidly in the mid-1990s, and MMS funded an assessment of local socioeconomic impacts (Hughes et al. 2001).

Hughes et al. (2001) used a Community Impact Model (CIM) to address economic, demographic, and fiscal impacts. The CIM consists of an input-output module (based on IMPLAN), a labor force module, and a fiscal module. The input-output module produces estimates of changes in output and employment resulting from increased activity in OCS-related sectors (e.g., petroleum extraction, ship building and repair, water transportation, air transportation). The labor force module estimates the effect of changes in employment on parish population, considering likely effects of changes in commuting and unemployment. Estimates of labor force, in-commuters, out-commuters, in-commuter earnings, and out-commuter earnings also are generated. Some of the estimates from the labor force module are fed back into the input-output module in a recursive fashion, which continues until changes resulting from feedback effects approach zero. Changes in population, in-commuter earnings, and out-commuter earnings feed into the fiscal module, where they are independent variables in equations estimating revenues and expenditures of local governmental units.

The fiscal module consists of 16 equations – two estimating revenue capacity (assessed property value and retail sales), four direct revenue equations (severance tax revenue, state transfer revenue, federal transfer revenue, and other tax revenue), and 10 expenditure equations (e.g., spending for schools, roads, law enforcement). The revenues and expenditures represent the sum of expenditures/revenues for the parish and all municipalities within the parish. The equations were estimated using cross-sectional regression based on data for a single year from all parishes in Louisiana.

The model is applied to project economic, demographic, and fiscal changes associated with OCS activity from 1995 to 2002 for Lafourche Parish. The OCS development scenario results in moderate increases in employment (up to 732 direct and 1,270 total jobs in the peak year 1998), population (growth of about 4,000 or 4.7 percent from 1995 to 2002), and local government revenues and expenditures. OCS development is projected to cause local revenues to increase more rapidly than expenditures (11.2% vs. 6.4% or \$20.0 million vs. \$9.6 million). However, the authors point out that the model estimates do not include some public service costs that result from unique needs of the offshore oil industry. Specific examples are (1) city water – a major bond issue (\$10 million) was needed to provide water to companies at the port (for use in drilling muds, etc.), (2) roads – increased truck and commuter traffic on the only highway accessing Port Fourchon has created a major concern, and (3) schools – costs to local school systems resulting from in-migration of foreign national workers (need for English as a second language [ESL] classes).

Luke et al. (1999) evaluate potential effects of an onshore support base located in the Florida Panhandle. The base would potentially support development resulting from Lease Sale 181 plus some or all of the Destin Dome development. (It is also possible that all of this activity might be supported from the Mobile, Alabama area or from elsewhere along the coast). The study team developed baseline projections for five Panhandle counties (encompassing Panama City, Fort Walton Beach, and Pensacola). In addition, studies of four key local industries (tourism, military, fishing, and ports) were conducted. The impact assessment uses IMPLAN and an Excel-based spreadsheet model. After examining the offshore support industry in the Gulf region, the authors concluded that an onshore base in the Panhandle would only service the operation and maintenance portion of an offshore project's life cycle (i.e., the exploration and development phases, and pipeline installation, would be serviced by bases elsewhere on the Gulf Coast).

Results show that the study area has experienced substantial in-migration and population growth over the past decade and is projected to have the same pattern over the project period. The local socioeconomic effects of the support base would be minimal, but would add to the pattern of baseline immigration.

Two studies that span several of the categories are described here because they are largely oriented at assessing impacts in either Louisiana as a whole or specific parishes within Louisiana. They are also studies that were initiated at the time oil prices were experiencing dramatic declines in the 1980s and thus the concepts and processes described in the western boomtown literature seemed particularly applicable to the Gulf. One is by Laska et al. (1993) and the other is by Seydlitz and Laska (1994).

The Laska et al. (1993) volume presents papers that appear to mark the initial involvement of several of the researchers in OCS related research. It is an edited set of chapters by different authors on different dimensions of OCS activity. The two chapters by Vern Baxter represent attempts to apply the organizational literature from sociology and the sociological analyses of corporations to the examination of the oil industry and its development in the Gulf of Mexico. He uses various aspects of the political economy model of organizational change to examine the effects of trends such as those in corporate restructuring on OCS development. Although largely theoretical, the chapters provide a useful placement of OCS activity in the setting of corporate organizational change in the United States. The chapter on suicide rates (Chapter 4) and homicide rates by Seydlitz et al. and their Chapter 5 on economic health and human capital are largely precursors to the work reported below (in the Seydlitz and Laska 1994 volume). The major difference is that this analysis is largely limited to the use of t-tests and related tests of significance between the two sets of parishes identified in the manner noted below.

Chapter 6, by Thayer and Hadley, provides an interesting overview of the fiscal structure of Louisiana as it relates to gas and oil and describes how Louisiana reacted to boom and bust cycles relative to fiscal changes. It suggests that Louisiana may not have prepared for the downturn in the OCS as successfully as other states. Chapters 7 and 8 are both by Sarah Brabant and are based on interviews with 50 respondents from Lafayette Parish (although comparisons to other parishes are made). Chapter 7 examines effects of OCS development on those in poverty, and Chapter 8 provides an examination of Louisiana communities' responses to boom and bust cycles. Particular emphasis is placed in Chapter 8 on the role of voluntary and other organizations to boom and bust cycles. The final chapter (Chapter 9) is again based on observational analysis and examines the impact of the absence of fathers (due to OCS employment) on families. It provides a useful review of the literature on the dimensions of such impacts. Overall, this effort represents preliminary work by the authors of the chapters and displays some of the methodological limitations that are likely to result from an attempt to gain widespread involvement in a relatively new area (to sociologists and economists) with a limited budget and time frame.

Seydlitz and Laska (1994) examine the effects of OCS development on social problems (i.e., suicide rates, homicide rates, juvenile commitments, and criminal cases), educational attainment and strain, and community economic health. Using secondary data from a variety of state and federal sources, they examine change in such factors over time in 24 Louisiana parishes grouped into two sets of 12 parishes each, with one set of 12 parishes being parishes highly involved in OCS activity and the second set consisting of parishes minimally involved in OCS activity as defined by the percentage of workers employed in, and income from, OCS related sectors. They examine trends across these factors for four time periods seen as indicative of periods in which OCS activity was displaying specific trends. These included a period of low activity (1956-73), a period of increasing activity (1974-81), a period of decreasing activity (1982-85), and another period of low activity (1986-1990). The authors use analysis of variance, time series, and t-tests to assess whether relationships exist between change in OCS activity and change in the areas of social problems, education, and health.

The results were relatively mixed in regard to all three factors. Although the authors suggest that there were effects of OCS development on social problems, the statistical analysis

`indicated signs on relationships that were often in the wrong direction and not consistently statistically significant in the direction indicated. Rates for social problems tended to increase but then decrease and “the relations are not clear, consistent, nor strong” particularly when levels of involvement are considered (Seydlitz and Laska 1994). Conclusions that boom-bust cycles are related to rates of criminal cases, homicides, and suicides seem only marginally supported by the analysis, and should be viewed with some caution. Using data on educational attainment and per pupil expenditures, they assessed impacts on education. Again, many relationships were not significant or showed unexpected relationships to OCS activity. The analysis of community health used the variables of per capita transfer payments, average per capita income, net migration, and per capita sales tax. Relationships were found, but they were not lasting for most of these variables. The study represents an attempt to bring quantitative data to bear on trends in a relatively small set of parishes and reveals many of the problems associated with such statistical analyses.

Unlike much of the other work done on the social impacts of OCS oil and gas activity, these authors do attempt to impose a theoretical frame work on their analysis. Two theoretical orientations are used: social disorganization and economic inequality. These approaches are used to try and explain impacts of oil development activity such as a decrease in civic participation, an erosion of social integration, and an increase in crime--impacts that are most frequently noted in those parishes most heavily impacted by oil development. However, while the authors argue that there is an increase in social problems with an increase in resource extraction activities that might be explained by these theories, methodological problems make their findings and resultant conclusions tentative, at best.

The analysis by Kelly and Wade (1999) documents existing economic conditions in the coastal Alabama region and highlights industry sectors important to the region's economy. This report discusses the interplay among the different users of the region's natural resources, notably tourism, fishing, and the offshore natural gas industry. Data are presented that show how tourism and the natural gas industry contribute to the economic growth of coastal Alabama. The recent conflict between the offshore gas industry and the tourism sector over the use of coastal Alabama resources is discussed.

The report focuses in four primary industries that contribute to the economic vitality of the Alabama coastal region: tourism, marine recreation, commercial fishing, and offshore natural gas. Tourism has been a rapidly growing sector in coastal Alabama, recording a 60 percent increase in tourist spending from 1989 to 1995. Taxes collected on retail sales and lodging are very important to local governments of the coastal areas, particularly Baldwin County. There is no evidence to indicate that the offshore gas industry has adversely affected the tourism sector in coastal Alabama. Nevertheless, Baldwin County and the communities of Gulf Shores and Orange Beach raised concerns when leasing was proposed near their communities. As a result, drilling has been limited to at least 15 miles offshore.

The marine recreation industry focuses on recreational fishing. Both private and charter boats target red snapper, among other species. The sport fishing interests are generally very accepting of the offshore gas industry as platforms enhance fish habitat. Conflicts more commonly arise between sport fishing and commercial fishing interests.

Alabama's commercial fishing industry is largely based at Bayou LaBatre and targets shrimp, as well as oysters and crab. Commercial fish landings have declined since the mid-1980's. Commercial fishermen generally perceive little conflict with the offshore gas industry.

The authors also discuss the onshore facilities that service the offshore gas industry. These include the Mobile port facilities, support bases located along the Theodore Ship Channel, at Bayou LaBatre, and on Dauphin Island, transportation and supply services, and ship building.

The authors also discuss the severance taxes that Alabama imposes on gas produced in state waters. These taxes provide an important source of state revenue. In addition, interest from two state trust funds (holding funds collected from bonus payments for offshore leases, state royalty payments, and federal 8(g) royalty revenues) constitute a very substantial revenue source (\$100 million plus annually, or about 12 percent of the state General Fund in 1999).

The analysis provides an important overview of the potential effects of OCS Development on resources deemed as central to local economies. It is one of the analyses that examine the competition and tradeoffs between oil and gas and other users of the OCS. As such it is useful in identifying potential areas of concern in this important development area.

The work by Tolbert (1994) addresses the effect of oil and gas industry expansion and contraction on personal and household income inequality in Louisiana and Florida. As such it represents a work that could also be placed in the economic impact section but is placed here because of the author's emphasis on the social implications of inequality for specific areas.

Tolbert examines changes in income measures for 1970, 1980, and 1990 for Louisiana coastal parishes and Florida Panhandle coastal counties. While the Louisiana parishes all had been substantially affected by the oil and gas industry, the Florida counties had few effects from this industry. The research tests a hypothesis advanced by Kuznets that industrial growth leads to a reduction in income inequality.

Specifically, the author first examines measures of (mean) per capita income and median family income. In 1970, per capita income and median family income in Louisiana coastal parishes were lower than in coastal Florida Panhandle counties. By 1980, the Louisiana parishes' incomes were higher for both income measures. However, by 1990, both income measures, adjusted for inflation, had decreased in the Louisiana parishes, and Louisiana values were again below corresponding values for the Florida counties. In fact, median family income in the Louisiana parishes had fallen below its 1970 level, after adjusting for inflation.

The effects of oil industry expansion (1970-80) and contraction (1980-1990) on income inequality are examined through three measures: (1) the Gini coefficient, (2) Theil's inequality measure, and (3) Atkinson's social-welfare function. Data were obtained from the decennial censuses. The findings were that income inequality in the Florida counties generally trended downward through the period from 1970 to 1990. In Louisiana, the pattern was one of decreased inequality during the 1970-80 period, followed by increasing inequality from 1980 to 1990.

The author attempted to control for the influence of various socioeconomic attributes of the local economy (e.g., the percent employed in manufacturing), of the local population (e.g., education, race), and of the national economy (e.g., change in GDP) on income inequality. The

results of regression analysis indicated that these factors accounted for one-half or less of the observed variation in income inequality. There remained a substantial unexplained component, but Louisiana inequality patterns clearly followed the expansion and contraction of the oil and gas industry more than they followed other variables.

Overall, the findings of decreased income inequality during periods of petroleum industry expansion and increasing inequality during periods of contraction supported the Kuznet's hypothesis. Tolbert also indicated that the major effect of the oil and gas industry on income inequality occurs in the middle to upper middle portions of the income distribution. He hypothesizes that this represents the effect of better paying jobs and appreciating personal assets during growth periods, and conversely during declines. The lack of effects in the lowest strata of the income distribution was attributed to the limited ability of low-income households to participate in oil sector job opportunities.

Overall, the data and methods used by Tolbert appear appropriate. The author used appropriate methods to control for other factors that might impact the dependent variable over time, the data sources and methods are well documented, and the findings and implications are discussed appropriately. This report represents a work that is generally both theoretically and methodologically more developed than a majority of work reviewed in this area.

What should be apparent from this review is that the range of socioeconomic studies supported by the studies program in the Gulf has increased substantially in the last few years. The criticisms raised previously that socioeconomic studies were not being completed in the highly developed and developing Gulf has clearly been addressed. In the next section we examine issues related to the scope and quality of the studies reviewed in this volume.

## **SECTION 4.0**

### **EVALUATION OF MMS STUDIES**

In this section, the MMS-sponsored studies reviewed in this analysis will be evaluated in regard to economic and fiscal, demographic and public service, and social and cultural impact analyses standards. Specifically works in each of these areas are examined relative to the impact dimensions, methods, and assessment processes and practices described above under the discussion of the criteria for evaluation. The evaluation thus examines:

1. The extent to which key impact dimensions are addressed;
2. The appropriateness, application, and documentation of the methods used;
3. The quality of the work relative to the state-of-the-art in the area;
4. The likely utility of the work for communities (residents and leaders) and MMS managers and decision-makers;
5. Areas/issues meriting further examination.

#### **4.1 ECONOMIC AND FISCAL IMPACTS ASSESSMENT**

##### **4.1.1 Impact Dimensions**

The materials evaluated here include those in the topical sections on petroleum industry studies, some of those on the history of the Gulf Coast, those on employment and expenditure studies, those on selected types of impacts, and some of those on area-specific impacts. The materials reviewed covered the key dimensions of economic and fiscal impact analysis. However, the extent/effectiveness of that coverage varied. The studies dealing with the Gulf of Mexico OCS petroleum industry and recent changes in the industry were quite good. Those dealing with historical, economic and social changes in the study area and impacts of past OCS activities also were useful. Perhaps the greatest concern is in the definition of the direct economic effects (employment, payroll, expenditures) associated with offshore operations and the distribution of those direct effects to onshore locations. The study by Centaur Associates (1986) provided a strong base, but this information must be updated. The study by Dismukes et al. (2001) addresses this topic, and the current MMS plans to obtain a comprehensive base of information and update on a five-year basis are promising.

The general area of regional economic effects (secondary and total) is adequately addressed. The specific issues of adverse economic impacts from oil spills and the effects on recreational fishing are also addressed. Finally, local economic and fiscal effects are addressed, albeit through only three case studies (Kelly and Wade 1999; Luke et al. 1999; Hughes et al. 2001).

##### **4.1.2 Methods**

The methods employed in these studies are generally appropriate, but the quality of documentation varied. As regards direct effects of OCS activities, Plater et al.'s (2000) report on their efforts to update and refine the earlier work of Centaur Associates (1986) and others to reflect the unique conditions in Alabama. Their approach seems very appropriate and well documented. The Dismukes et al. (2001) study also addresses direct effects. Their work

appeared to be limited significantly by restrictions on data collection, and their documentation could have been more complete.

In assessing regional economic impacts, the IMPLAN model is used almost exclusively. Input-output models generally have become the standard approach to regional economic impact assessment, and the IMPLAN model is the most widely used I-O model. Specific studies of impacts of oil spills (Pulsipher et al. 1999) and recreational fishing (Hiatt and Milon 2001) use appropriate methods and are well documented.

Analyses of local economic and fiscal impacts are represented by two case studies (Luke et al. 1999; Hughes et al. 2001). The Hughes et al. (2001) study uses a Community Impact Model, consisting of an I-O module, a labor force module, and a fiscal module. The latter two modules are based on equations derived from cross-sectional regressions with data from all parishes in Louisiana for one year. Thus, the equations reflect average relationships across all parishes, which may or may not be representative of relationships in the coastal parishes. The documentation of these modules is cursory. For example, the reader is left to wonder how the values of explanatory (independent) variables for some of the equations are being forecast (for future projection periods). It should also be noted that the CIM estimates revenues and expenditures for all local jurisdictions within a parish, combined. Thus, there is no basis to discern if, for instance, the parish government is generating a surplus while cities or school districts may have serious deficits, or vice versa.

Similar to the Alabama studies, the work by Luke et al. (1999) reflects a state-of-the-art approach. It is based on an extensive review of socioeconomic impact efforts throughout the world including the Gulf of Mexico and uses standard I-O modeling procedures. It reflects the commonly accepted standards for this type of work.

#### **4.1.3 Quality vs. State-of-the-Art**

Generally, the methods used appear to represent the current state-of-the-art. As mentioned previously, IMPLAN has become the standard approach for regional economic impact assessment. The CIM used for assessing local fiscal impacts is part of a “family” of such models that are generally regarded as being the SOA for this type of analysis. However, the documentation of the Louisiana CIM should be expanded to provide a more comprehensive description of the underlying assumptions and algorithms associated with each model component.

#### **4.1.4 Utility for Decision Makers**

The utility for decision makers can best be evaluated for the regional economic and the local fiscal impact analyses. The regional economic analyses are exemplified by MMS (1997; 2002) [EIS for Lease Sales 171, 174, 177, and 180 and 187, 194 etc.]. The regional economic impacts are discussed at the level of multicounty subareas (labor market areas) along the Texas and Louisiana coasts. Employment and population effects are estimated to be less than 1 percent of baseline values in all subareas. These levels of employment change would not be expected to trigger in-migration, but the authors point out that requirements for specific skills, coupled with a



“shadow effect” from the previous bust, could result in some in-migration to fill specific labor needs.

The EIS also addresses cumulative effects of OCS oil and gas activities. Total OCS-related employment, projected by subarea, reflects moderate growth to about 2007, then a gradual decline for the next 30 years (MMS 1997). The largest relative effects are in LA-1 (Lake Charles) and LA-2 (Lafayette-Port Fourchon), where OCS-related employment sometimes exceeds 10 percent of total regional employment. This presentation of regional economic effects is one that should have a high level of usefulness for decision makers at all levels.

The most recent EIS (MMS 2002-CPA Sales 185, 190, etc. and WPA 187, 192, etc.) uses slightly different procedures in allocating expenditures to onshore areas and calculating impacts, but the format used in presenting results is very similar to that used in the 1997 EIS.

The local fiscal analysis of Lafourche Parish (Hughes et al. 2001) has been useful for MMS decision making and for local planning. The level of aggregation particularly may be an issue, however. From the viewpoint of MMS, it is likely sufficient to have estimates of total population at the parish level, local government expenditures and revenues at the parish level, etc. From the viewpoint of a local official, however, it is then important to know more about the characteristics of the in-migrants, revenues and expenditures by jurisdiction.

#### **4.1.5 Areas/Issues Meriting Further Examination**

Some areas that should receive added attention include:

1. **Direct effects of OCS activity** (employment, payroll, expenditures) and how these are distributed onshore. Some sort of system to monitor/periodically update these could pay substantial dividends;
2. **Oil spills.** It may be useful to followup a study like Lake Barre (Pulsipher et al. 1999) to see if any longer term effects have been manifested;
3. **Local fiscal effects** could be analyzed for more cases. Also the distribution among local jurisdictions (county, cities, school districts) should be examined.

In general, then, we found the economic and fiscal analysis to be generally SOA in regard to the dimensions examined and the methods used. It is most lacking in its provision of data for local-area jurisdictions that must manage the impacts of leasing, development, operation, and decommissioning activities.

## **4.2 DEMOGRAPHIC AND PUBLIC SERVICE IMPACTS ASSESSMENT**

### **4.2.1 Impact Dimensions**

Demographic impacts generally involve assessments of population size, distribution and characteristics and changes in size, distribution and characteristics of the population under baseline and impact conditions while assessments of public service impacts involve examinations of service demand and supply factors relative to personnel, facilities and

equipment. As noted above, services commonly examined include schools, hospital and other health services, law enforcement, fire protection and EMS services, water, sewer, electric, transportation, recreation, housing, and social services. Many of the analyses provide demographic information (see for example Austin et al. 2002; Wallace et al. 2001a; Hughes et al. 2001) and some examine public service impacts (see Hughes et al. 2001; Laska et al. 1993), and virtually all specific-area assessments (Seydlitz and Laska 1994; Luke et al. 1999; Hughes et al. 2001; Austin et al. 2002; Wallace et al. 2001a) examine impacts on populations and some services. Much of the work completed to date, however, has failed to examine a sufficient number of dimensions for a sufficient number of geographic areas. As a result, generalizable knowledge bases have not been established on several key demographic and service dimensions for a sufficient number of OCS subareas.

Analyses completed to date extensively describe existing conditions (Wallace et al. 2001a) and/or project the numbers (e.g., Hughes et al. 2001) of new persons and their general characteristics. They have less often examined key research issues related to population change as affected by OCS development in the Gulf of Mexico. For example, the work by Wallace et al. (2001a) provides a wealth of quantitative historical information on demographic and some service demands in three distinct parts of the Gulf for an extended time period. But, as noted above, its statistical analysis of the relationships of these factors to OCS development is limited in several regards. As a result, although providing useful descriptive information, it does not provide a sufficiently detailed statistical analysis of the demographic effects of OCS development. Similarly, although the Hughes et al. (2001) analysis uses assumptions about immigrating and outmigrating worker characteristics, these assumptions are not adequately based on empirical information. In addition, although the Austin et al. (2002) analysis provides a wealth of information on families in the Gulf and their responses to various aspects of OCS development and operational conditions, its conclusions are limited by the qualitative nature of the data that do provide information that can be assumed to be representative. Finally, virtually all of the analyses of demographic and public-service impacts are quite area-specific providing little information that can be generalized to new areas of development in the Gulf and although the Centaur Associates, Inc. (1986) analysis (and recent and planned MMS analysis of OCS workforces) provides a useful analysis of demographic factors through its examination of labor forces, it is not representative of existing studies nor is it of sufficient recency. As a result, relatively little is known about the distribution and variation in family size and composition for OCS-related workers in various industries, about population settlement and resettlement patterns resulting from OCS activities or about the characteristics of OCS related migrants, their families or numerous other factors for a sufficient number of different subareas in the Gulf of Mexico Region. The analyses completed to date represent important first steps but substantial additional work remains to be completed.

Similarly, public service analyses have tended to be incomplete relative to the range of services examined for different parts of the Gulf of Mexico. For example, assessments of services are provided in Seydlitz et al. (1994), and in Hughes et al. (2001) and service usage factors are found in work on poverty and crime in Seydlitz and Laska (1994) but they are quite service specific. Hughes et al. (2001) note for example that their assessment does not examine water, roads (e.g., transportation) and schools. These are key services that simply cannot be omitted if an assessment is to be generally useful. Similarly, assessments evident in MMS

impact assessments (see MMS 1997; 2002) generally do not provide assessments of existing supplies of services.

Similarly, the coverage of these dimensions in EISs (see for example the EIS for Lease Sales 185, 190, etc.) is often cursory and not sufficiently jurisdictional-specific. In the case of EISs the range of demographic characteristics (other than total population) is often limited as are the basic components of population growth (i.e. there may be no mention of the number of migrants likely to come to an area or of the aspects of growth due to workers compared to their dependents). Equally problematic is the fact that the data are often provided at geographic levels that are not equivalent to decision-making, legal jurisdictions. Projections for broad regions are likely to be of limited utility to parish, county or city decision makers who must decide how and where to allocate resources to address future growth or decline. The MMS information in this area requires substantially more jurisdictional detail.

#### **4.2.2 Methods**

The methods used in MMS related analyses of demographic and public service impacts, although within the range of widely used methods, tend to be at the least developed end of the methods spectrum. The need for broad-based multi-county assessments has been widely recommended to MMS (see Carney 1998) but it is disappointing that critical statistical analyses that could provide information that could be more widely generalized are often inadequate. For example, the very useful work by Wallace et al. (2001a), that by McKenzie et al. (1993) and that by Seydlitz and Laska (1994) examine a relatively large number of variables for a large number of areas but lack statistical sophistication. Similarly, several of the EISs examined used population projections based on the use of simple ratios from state to county/parish values to obtain total populations, and many contained no projections with age or race/ethnicity specificity (see the EIS for Lease areas 185, 190, etc.). Hughes et al. (2001) provide a noticeable exception in that they examine expenditures and other characteristics for different types of migrants but this is for one area, Louisiana. Although Hughes et al. (2001) and Luke et al. (1999) provide examples of the use of more sophisticated techniques in demographic projections, simple population to employment ratios (see MMS, EISs, 1997; 2002) are too often used and, in service projections, supply dimensions are seldom considered. Given that more sophisticated cohort based and service supply moderated models have been in existence for more than two decades (Leistritz and Murdock 1981), more sophisticated methods could be used in the assessments and assessment models. When historical and other analyses of demographic and public service change are completed, as in the historical analysis noted above, they also tend to examine simply the total numbers of persons or service users rather than any dimensions related to population or service characteristics. There is a clear need to employ more sophisticated methods in impact projections and to examine additional areas with additional statistical sophistication in the analyses of demographic and public service impacts.

#### **4.2.3 Quality vs. State-of-the-Art**

As suggested by the above discussion of methods used in demographic and public service analysis, we believe that the demographic and public service projections have often not reflected the best of SOA methods. Both in terms of the methods employed and the dimensions of population and public services provided additional development and refinement is essential. The

more extensive use of cohort-component based population projections and of service projections incorporating quantitative estimates of service supply shortfalls or surpluses are examples of the types of enhancements required in these areas.

#### **4.2.4 Utility for Decision Makers**

The information provided by assessments and studies is likely to be of substantial utility to decision-makers due to the very nature of the areas themselves; that is, information on population and service demand are basic inputs to local planning. As such, despite the limitations noted above, the demographic and public service information being provided is certainly of substantial utility to decision makers. At the same time, it must be noted that data providing additional detail on population characteristics and on likely service shortfalls resulting from differences between supplies of, and demands for, services would be of additional utility. For example, knowing the age, sex, and race/ethnicity characteristics of projected populations for specific jurisdictions can be important in planning such services as those for children, women and the elderly, and for discerning the need for bilingual education in schools. Knowing where service shortfalls are likely to be most extensive can guide local governments in budgetary and service planning. The utility of demographic and public service data will be increased to the extent that additional characteristics and jurisdictional detail are provided.

#### **4.2.5 Areas/Issues Meriting Further Examination**

The issues meriting additional attention in this area both from the standpoint of the ESP and EISs include examinations of:

1. The sources by population characteristics and geographic area of origin of workers relative to local and nonlocal (migrant) resident sources;
2. The characteristics of direct, indirect and induced workers and their families, both those coming from local populations and those migrating into (or out of) the area due to OCS activity;
3. The effects of immigrating populations, and of outmigrating populations, on services of all types in different parts of the Gulf under different forms, types and levels of development;
4. The existing service capacity by type of service for numerous jurisdictions in the Gulf;
5. Comprehensive assessments of types and levels of service requirements that have actually occurred in impacted jurisdictions for different forms, types and levels of OCS development in a variety of Gulf areas;
6. The development of appropriate methods for the projection of population and public service impacts with sufficient detail and geographic specificity and the inclusion of jurisdiction-specific population and public service data in MMS OCS impact assessments and statements.

In sum, as for economic and fiscal analysis, MMS has completed numerous (and has several additional soon to be completed) studies that include demographic and service dimensions. These studies provide a substantial increase in the amount of information available relative to that which existed in the early 1990s. These represent significant efforts but we

believe that the detailed research on, and analyses of, demographic and public service dimensions, not simply the projection of region-wide numbers of services needed, requires substantial additional attention. Current plans to develop an ongoing inventory effort for OCS workers will help to address these areas of need but additional attention is essential. Since the key to the assessment of many socioeconomic impacts is the determination of new populations and their settlement patterns, the need to address such information needs in an expeditious fashion is evident.

In the areas of demographic and public service analyses it is thus evident that whether examined from the standpoint of the range of demographic and public service dimensions examined, the types of methods employed, and the provision of such information at appropriate geographical levels MMS ESP and EIS analyses require supplementation. Progress has certainly been made relative to the pre-1992 periods but additional studies and incorporation of SOA methods and procedures is required.

### **4.3 SOCIAL AND CULTURAL IMPACTS ASSESSMENT**

#### **4.3.1 Impact Dimensions**

The analysis of social and cultural impacts is largely limited to the analyses by Austin et al. (2002) on individual and family impacts, Wallace et al.'s (2001a) attempt to comprehensively examine socioeconomic impacts in the Gulf, Tolbert's (1994) examination of the effects of OCS development on inequality and Blanchard's (1999), Gramling et al.'s (1995) and Kelley's (1999) delineations of stakeholders' and other residents' issues related to OCS development, Gramling's (1995) historical examination of the development of oil in the Gulf, and Laska et al. (1993) and Seydlitz's and Laska's (1994) analyses. However, other studies such as those by Hughes et al. (2001) do include some limited social analyses. Relative to the historical base of information in these areas, these studies represent an extensive expansion in social and cultural information. They examine residents' perceptions (Gramling et al. 1995; Blanchard 1999; Kelley 1999), impacts on individuals and families (Austin et al. 2002), effects on poverty, social problems, community health and viability, community organizations, effects of social inequality, and other key social and cultural factors (Laska et al. 1993; Tolbert 1994). It is evident then, that MMS has taken a quantum leap forward in this area relative to its historical base.

Typically, efforts to address the social and cultural impacts of energy development projects have focused primarily on effects on major social institutions and/or social psychological attitudes and values in specific areas within the Gulf. While few of the studies reviewed do any systematic analysis of impacts of OCS oil and gas development across the various institutions, the following generalizations can be gleaned from the various individual studies:

1. **Family:** Most of the earlier studies focused on the negative effects of employment in the oil and gas industry on families. Much of this work addressed the effects on family structure and roles of work schedules that require a parent (usually the father) to be away for extended periods of time (Austin et al. 2002; Gramling 1995; Gramling et al. 1995; Shrimpton and Storey 2001). Among the major conclusions that can be drawn from these studies are the following: most

families do experience a period of adjustment to the work schedules and must negotiate (and renegotiate) the roles of mother and father, as well as the relationship of each parent to children; families do tend to adapt over time; informal mechanisms as well as more formal mechanisms (such as professional counseling) have evolved to help families adjust; new developments, such as improved telecommunications, have helped families deal more effectively with extended periods of separation;

2. Religion: While relatively few of the studies have addressed the role played by churches, it has been noted that churches have been important in providing things like food, clothing, and shelter during down times in the industry (Austin et al. 2002). At the same time, donations to churches decrease during “bust” cycles, and it becomes even more difficult for churches to fill their accustomed “social support” role;
3. Education: Major impacts on the institution of education are noted in several of the studies (Austin et al. 2002; Gramling 1995; Seydlitz and Laska 1994; Laska et al. 1993). For example, the earnings gap based on education level is increasing with an increased emphasis on technology and specialization. There is increased evidence of a glass-ceiling for the uneducated, again because of an increased emphasis on education (Austin et al. 2002). On the hiring front, degrees are becoming more important and families and social networks are becoming less important. In the 1950’s, local students were trained for a life in the oilfield. Now, increasingly, local technology schools are emphasizing a much broader curriculum and are trying, in some ways, to distance themselves somewhat from the oil and gas industry. While parents may continue to value their own careers in the oil industry, more of them are encouraging their children to go to college and to not plan on careers in the oil industry. Increasingly, there is the attitude that young people will “try” college and if that doesn’t work, they can fall back on employment in the oil industry. Finally, the “boom” and “bust” cycles have major effects on education. During boom periods, schools become overcrowded. During bust periods, they face major funding challenges;
4. Government/Community: A significant change in recent years has been a substantial growth in government regulation of the oil industry (Blanchard 1999; Seydlitz and Laska 1994; Laska et al. 1993; Kelley 1999; Austin et al. 2002). For example, some of the studies note that 20-30 years ago, efforts to regulate the industry were more limited. Money was good and hours were long. In recent years, numerous new labor laws have been instituted. Some of the smaller communities have tried to avoid or diminish an “oil town” image by increasing tourism or trying in other ways to diversify the local economies. In communities like New Iberia, there is an ongoing conflict between the sugar and land elite and the oil industry. Outsiders and newcomers often feel unwelcome;
5. Formal/Informal Organizations: As is the case in many other areas, work relationships have become more formalized (Austin et al. 2002; Seydlitz and Laska 1994). As noted above, hiring decisions are increasingly made based on educational achievement rather than on family and social network ties. The workforce has become increasingly unionized. Contract labor has replaced traditional patterns of company loyalty to their local workforce (and, in turn,

affected worker loyalty to the company). However, even in this context, informal social networks still play important roles in helping workers and their families cope with the stresses of the work environment;

6. Health care services are impacted by the ups-and-downs of the industry (Austin et al. 2002). For example, some major hospitals in the area are struggling because “bust” cycles result in the loss of a portion of the patient population. A more recent change is that because of work schedules many workers commute and thus receive their healthcare elsewhere. Local hospitals report high volumes of bad debt and high emergency room costs. They also report low utilization of preventative and screening services. Finding and keeping a skilled professional staff is a major problem (Austin et al. 2002). On the mental health side, mental health and substance abuse needs remain high in these communities. There is a need for more focus on early detection, screening, and cost containment.
7. Social services are also impacted by the industry (Austin et al. 2002; Seydlitz and Laska 1994; Gramling et al. 1995; Carney 1998). While local churches, the United Way, and other groups provide emergency food, clothing, and shelter during “bust” periods, there are also major pressures on other social service agencies. During down times, when the need is greatest, donations decrease. The heaviest pressure on social service agencies is reported to come from transient populations (Austin et al. 2002);
8. Sociocultural Patterns: It is noted in one of the studies that 90% of the variance in employment patterns can be explained by national and international indicators of the world oil market (Wallace et al. 2001b). The increase in the number of women and minorities who are being employed is an important shift, and affects workforce and community diversity issues. What is happening in the Gulf of Mexico is obviously an indicator of an important globalization of the oil and gas industry workforce. Additionally, the restructuring of the industry is contributing to a decrease in worker loyalty and higher turnover rates.

Turning to the issue of social psychological attitudes, values, and perceptions, even less information is included in the studies reviewed. Among the generalizations that can be drawn are the following: there are important age and generational changes occurring. Younger workers have quite different expectations of parenthood and are less committed to the industry. First generation workers entered the business because wages were high. Older adults who have been employed in the industry do not regret the life they have had, but frequently prefer something different for their children (Austin et al. 2002). The older generation focuses on the benefits of employment in the industry; the younger generation does not. These financial incentives are now less secure. And, across the industry, there are increasing concerns about safety issues. The attitude studies also reflect changing expectations of parenthood. Both fathers and mothers are increasingly likely to desire increased involvement of fathers in parenting, something made difficult by deepwater development employment schedules.

Finally, several of the studies suggest that there have been negative effects on various forms of social behavior as a result of the industry (Seydlitz and Laska 1994; Laska et al. 1993; Gramling 1995). These include higher divorce rates and domestic violence, increased crime, alcohol abuse, and depression, and increased drug trafficking associated with the growth in the

number of transients attracted to the area. However, these observations are largely without strong empirical support

Additional needs not yet addressed remain, however. Establishing differences in social and cultural impacts by area, development phase, and type of development (e.g., deepwater versus traditional OCS development) have yet to be adequately completed. Although stakeholder assessments are important, comprehensive assessments of residents' attitudes and perceptions have not been completed. Additional studies of institutional change to include informal organizations which are often essential to resident adaptation should be completed and the implementation of a comprehensive system for the periodic monitoring of social impacts in key areas of the Gulf should be considered. Nevertheless, MMS is to be commended for its attempts to expand its knowledge in these impact areas.

Unfortunately, despite progress in ESP analyses related to these areas, social and cultural considerations are absent from many MMS EISs. Perhaps the recency of these analyses has prevented their full use in EISs, but the coverage of such issues in EISs is simply insufficient. MMS must consider means for moving this work into its EIS process.

#### **4.3.2 Methods**

The social and cultural studies include a variety of qualitative and quantitative methods for the assessment analyses. For example, among the range of methods used are residential ethnographies, informal observation, site visits, employment of local research collaborators, informal discussions with workers, their families, and other local residents, more formal interviews, focus groups, and attitude surveys. The historical discussions and descriptions in this study area such as that by Gramling (1995) and the work by Baxter (Laska et al. 1993) are generally quite informative and appear to be soundly grounded in factual accounts of past events. The qualitative observational analyses provided in Austin et al. (2002) and Wallace et al. (2001a) are extensively described and are the most comprehensive and thorough use of such methods evident in the work reviewed for this analysis. Qualitative observational analyses related to the efforts by Laska et al. (1993) (and the component studies of this edited work) and in the Seydlitz and Laska (1994) efforts, as well as the stakeholders' assessments by Blanchard (1999) and Kelley (1999) are less well documented. In fact, throughout the work reviewed in this assessment, particularly that outside of the work by Austin et al. (2002), Wallace et al. (2001a), and Kelley (1999) discussions of procedures used to validate patterns identified from preliminary observations are seldom provided and basic discussions of issues related to the likely representativeness of informants and similar issues are not discussed with sufficient thoroughness to allow one to assess the validity of the results. As a result, one cannot be confident in either the generalizability or the accuracy of the conclusions drawn from some of the analyses.

The quantitative analyses provided in these works are much more problematic, both in terms of the appropriate application of methods and in terms of interpretation. In several works including that by Wallace et al. (2001a) and Seydlitz and Laska (1994), there is questionable use of methods such as time series analysis techniques with very small numbers of cases and time observations. Perhaps more problematic is the fact that authors (see Seydlitz and Laska 1994) often find statistical results that are not consistent, clear or strong (meaning relationships are



often in the wrong direction, not statistically significant and show little persistence across time), and yet conclude that they found support for the existence of specific forms of impacts. Such interpretations are clearly problematic.

Overall, then, although standard methods have been utilized, it appears that methodological rigor has been more closely approximated in the area of qualitative analyses and much less so in the quantitative analyses provided in these studies. The quantitative analyses presented in the various studies are relatively unsophisticated, and many of the interpretations are not particularly insightful. Greater attention to methodological documentation and care in interpretation is essential.

#### **4.3.3 Quality vs. State-of-the-Art**

Given the above evaluations, it is appropriate to conclude that the MMS literature reviewed relative to social and cultural impacts is increasingly approaching SOA levels relative to the content issues examined in studies but not in EISs. Relative to methodology, it is not yet SOA particularly as it relates to quantitative methods of analysis. Attention should be given to ensuring greater adherence to SOA method applications and interpretations.

Overall, we must conclude that both the quantity and quality of work on what are typically defined as “social” impacts leaves much to be desired. In fact, it is difficult to really address the policy implications of much of this work because of its methodological limitations. For example, several of the studies rely on interview methods, but the surveys were conducted under less than state-of-the-art conditions. Sampling methods are particularly weak. Therefore, it is difficult to judge the extent to which social institutions have been seriously impacted or to which social problems in the impacted communities have (as is alleged) increased.

More attention has been given to the institution of the family than any other. It is evident that there are important stresses and strains on families as a consequence of insecurity of employment associated with traditional boom and bust cycles and as a result of work schedules that require that oil workers spend extended periods, often a week or more, at their workplace. However, as noted by Shrimpton and Storey (2001) in their recent cross-national review of offshore employment, this system should not be seen as inherently problematic. As is true for other systems, it has both advantages and disadvantages for the workers and their families.

There are other limitations of the work reviewed. For example, again as noted by Shrimpton and Storey (2001), studies conducted to date have focused on large operations, fixed work schedules, and married male workers. Clearly, additional work is needed on women, minorities, older, and single workers. The data are often anecdotal and do not allow one to address issues of cause and effect.

Finally, much of the work on social impacts has assumed primarily negative effects, based, we believe, on the reliance on older social impact studies that have been conducted in a very different context. While there are negative consequences for families and communities, there are some obvious positive effects, as well. These deserve additional attention in future studies.

#### **4.3.4 Utility for Decision Makers**

Several of the products reviewed are likely to have substantial utility for decision makers. The assessments of stakeholders' views of key issues are clearly of importance to MMS decision makers in their planning efforts. Attempts to address key areas of concern in leasing and development can be guided by such information. Similarly, the information on family and individual impacts in different types of industries should be useful to both communities planning social services and to employers in setting work schedules and providing family-related and counseling services to employees. All of the studies should serve to sensitize decision makers to key social issues likely to be impacting their areas and residents.

Additional attempts to move beyond description to suggestions that can be implemented by local jurisdictions and individual firms are necessary. Several of the works do make policy suggestions (see Seydlitz and Laska 1994, Laska et al. 1993, and Austin et al. 2002), but they tend to be broad-based. Social researchers need to develop their abilities to provide recommendations at jurisdiction-specific levels.

#### **4.3.5 Areas/Issues Meriting Further Examination**

As noted above, substantial progress has been made in the inclusion of social and cultural research in ESP studies in the Gulf when viewed relative to historical periods. Much remains to be done, however. Analyses are needed:

1. To determine the actual level of social impacts across the OCS Gulf of Mexico Region for different types of social subgroups and developments across the development cycle;
2. A Gulf wide assessment of a representative sample of Gulf of Mexico residents' attitudes, values and perceptions of OCS developments might be completed as a base against which to assess change;
3. The very useful family and individual impact analyses noted above should be extended to other social institutions and to other areas within the Gulf of Mexico;
4. More sophisticated and thorough quantitative analyses should be completed of social disruption, social conflict, and social service impacts in different parts of the Gulf during different development cycles.

Progress in the assessment of social and cultural impacts has been extensive. The extension of such work to additional sites and substantive areas and the use of improved methodological standards are necessary to move it to the next level of development.

## **SECTION 5.0**

### **SUMMARY, IMPLICATIONS AND RECOMMENDATIONS**

The literature reviewed and the evaluation of the studies above provide substantial information about the MMS ESP program in the area of socioeconomic impacts. In this final section, it is appropriate to provide an overall assessment of progress, continuing limitations, and recommendations relative to future studies. Each of these factors is discussed below.

#### **5.1 PROGRESS TO DATE**

The MMS Gulf of Mexico socioeconomic studies program has shown substantial progress in the last decade. In our view the agency has listened and responded to its critics and constituents and is aware of the critical socioeconomic dimensions in OCS development (Cluck and Luton 2002). If one examines the criticisms of the National Research Council (1991; 1993), the recommendations from its 1993 socioeconomic workshop (Gramling and Laska 1993), or from its workshop on deepwater issues (Carney 1998), MMS has responded. These forums suggested large scale multi-dimensional studies of socioeconomic impacts in the Gulf, and MMS has responded as is evident in the efforts by Austin et al. (2002) and Wallace et al. (2001a). These forums recommended additional industry studies, and these have been addressed in the effort by Wallace et al. (2001b), by Baxter (in Laska et al. 1993), in the work by Pulsipher et al. (1995) on differences in independents and major oil producer operations, and Pulsipher et al.'s (2001) forecast of the number of offshore platforms. They recommended stakeholder studies, and these have been addressed in the work of Blanchard (1999), Gramling et al. (1995) and Kelley (1999). These critiques recommended assessments in distinct parts of the Gulf, and these have been addressed in the work by Austin et al. (2002) for areas in Texas, Louisiana and Alabama; specialized analyses for coastal Louisiana in the work of Seydlitz and Laska (1994); Wade et al. (1999) for Alabama as a distinct area, and in Luke et al. (1999) for the Panhandle of Florida. They recommended specific analysis of individuals and families, and these have been addressed in the work of Austin et al. (2002). They recommended analysis of events that might provide insight into wider phenomena, such as the analysis of the impacts of an oil spill by Pulsipher (1999). They recommended studies of key social institutions including the family, community disruption, organizational and community response to OCS development and these have been addressed (see Seydlitz and Laska [1994]). Although questions may be raised about how well some of these factors have been addressed, the Gulf of Mexico office of MMS has attempted to be responsive.

Progress in socioeconomic analyses has not been uniform, however. Substantial progress has been made in economic impact modeling and this work largely reflects the SOA. Demographic and public service impacts were described in basic terms in MMS research before the recent increase in socioeconomic research and thus started at a more developed level than social and cultural assessment research but, as noted above, progress in this area has been limited in recent research. In the sociocultural arena, too many of the conclusions are based on insufficiently verified information and are only partially supported by the more quantitative analyses. We must conclude, based on the information in the studies, that comparatively less is known (in an empirical sense) about the impacts of offshore oil development on onshore social issues. Progress has thus been extensive but also uneven.

Although, as was noted above and will be noted further below, we believe there is substantial additional work that is necessary both in terms of baseline data collection and long-term ongoing analysis, it is appropriate to commend MMS for its substantial progress in addressing socioeconomic research issues of concern in the Gulf of Mexico.

## **5.2 CONTINUING LIMITATIONS**

Despite substantial efforts and progress in fielding socioeconomic studies, several limitations continue. Some of these limitations are a result of the unique contexts and other factors noted above as limiting socioeconomic assessments in the Gulf, while others are less generic and have resulted from a variety of factors that may be capable of alteration.

Two generic limitations require attention. One such limitation is evident in that none of the retrospective or historical studies examined in this review has been able to adequately separate baseline from OCS related change. Although the Gulf has often been seen as a nearly ideal laboratory for the examination of OCS impacts, the lack of a true baseline and the concurrence in time of OCS and other social and economic events has made the task of identifying OCS specific impacts very difficult. Added to these difficulties has been the fact that the many operating platforms and service providers in the Gulf tend to mask, confound, and diffuse project-specific impacts. It may be necessary to reconsider whether retrospective analyses will provide the wealth of information that they were once expected to produce. Greater emphasis on current and future project impacts may be worthy of consideration because of the potential ability to trace their impacts through workforce, expenditure, and other forms of surveys and data collection with existing OCS levels of development considered as simply part of the baseline for OCS development areas.

The second limitation, closely related to the first, is the fact that the identification of a specific impact area has been nearly impossible. In fact, in the work by Wallace et al. (2001a) and that by Seydlitz and Laska (1994) the search for more adequate impact versus non-impacted areas presented major methodological challenges. Because of the nature of OCS employment, the standard delineation of impacted areas as being those areas where the direct and indirect workers resulting from the development reside is not a sufficient criteria for delineating the impact area. Similarly, because of the multiple number of projects taking place in the Gulf, many of the service employees (e.g., in helicopters, supply services, etc.) serve multiple projects making attribution of impacts additionally difficult. We believe that MMS intentions to initiate a recurrent survey of industry workers and expenditures will help address this dilemma, but additional conceptual and methodological work may be necessary.

A third limitation is more directly addressable. This is that, despite the substantial increase in socioeconomic studies, there is virtually no indication that this knowledge base has been incorporated into EISs. With the exception of some increase in the use of input/output models, EISs appear little changed from those from a decade ago. The use of EIS alternatives that might vary workforce schedules for workers, that might utilize alternative levels of local workforces or alter other key factors shown by socioeconomic analysis to be important to establishing the magnitude and distribution of impacts are not evident, and even the broad-scale impact projections provided for areas associated with social impacts, such as demographic change, have seldom been interjected from these studies into EISs. EISs by MMS for the Gulf of

Mexico should be informed by the best information available, and we believe that that is not consistently occurring in relation to socioeconomic factors.

### 5.3 RECOMMENDATIONS

In reviewing the materials for this analysis and current plans of MMS, we believe the following general recommendations are merited:

1. We strongly recommend that the MMS continue its developing efforts in economic impact modeling. After years of not being SOA in this area, it is nearly SOA in all regards, and efforts in this area should be strengthened. In this regard, we believe the development of more sophisticated demographic and public service components of such models that employ cohort-component based demographic models and service supply considerations should be a priority. Similarly we recommend increased local-area specificity in such models. Such recommendations are clearly based on SOA practices as delineated above and in Leistritz and Murdock (1981);
2. We also highly recommend that MMS place high priority on its effort to obtain recurrent industry employment and expenditure data. Such data offer substantial hope for identifying both OCS unique impacts and the likely location of such impacts. The widespread use of the information in the analysis by Centaur (1986) demonstrates the utility of such efforts. Given the volatility of the industry we believe that the collection of such data on a less than five year cycle should be given further consideration;
3. The studies examined shared similar challenges in differentiating the impacts of historical OCS development from other sources of change. In many cases, such as in the analysis by Wallace et al. (2001a), the efforts made were extensive. However, it is also apparent that many economists, demographers, sociologists, anthropologists, and other social scientists simply are not sufficiently trained in advanced statistical procedures for use in such analyses. We thus recommend that MMS consider funding one or more statistical studies aimed at developing appropriate procedures for identifying unique OCS development effects, including in the deliverables for these studies the provision of advanced statistical training of Gulf of Mexico social scientists. Procedures such as those used in such areas of statistics as Linear Structural Relations Analyses and others might be considered, but a contract seeking assistance from statisticians to address this underlying problem could provide extremely useful and widely applicable information;
4. Based on generally accepted standards for socioeconomic analyses (Leistritz and Murdock 1981; Vanclay and Bronstein 1995; Porter and Fittipaldi 1998) we also strongly recommend the development of studies aimed specifically at examining important dimensions of OCS related population change and community public service infrastructure development. Studies of worker settlement patterns, population characteristics, and migrant characteristics are only some of the areas that require current attention. Similarly, although MMS has given considerable attention to the analysis of the infrastructure necessary to directly support OCS development and its area-specific studies often discuss problems in service

provision, the data are not uniformly collected or comparable. Given the importance to local officials of knowing what the effects of OCS development will be on public services, this should be a high priority area. Although the proposed recurrent industry studies will provide substantial data that may contribute to the level of demographic knowledge available, we also recommend that consideration be given to a program for monitoring demographic change through labor force changes; that is, that recurrent information be obtained on the demographic characteristics and settlement patterns of not only direct workers but also indirect workers and their dependents;

5. Based on the evaluation of social and cultural studies described above, we also recommend that the social and cultural analyses initiated be expanded and refined in the following ways. Given the diversity of areas within the Gulf we believe that analyses in this area must be subarea in nature, although attempts should be made to make studies as comparable as possible across areas. We believe that major sociocultural analyses, involving such things as resident attitudes, perceptions, and values, community organizational change, and diverse forms of social disruption might be conducted in areas/communities that are being most impacted by OCS development. One approach might be to conduct a series of case studies of the major ports where OCS activity is most clearly evident. This would allow a more detailed identification of major sociocultural impacts on these areas, and would allow important comparisons to be made from one case study to another. While there would be several advantages to this type of an approach, one of the most important is that it would form a type of “base” against which future impacts of development could be assessed. Partial analyses have, of course, been completed but comprehensive analyses of multiple social and cultural areas should be completed. Care should be taken in such analyses to ensure that research teams completing the analysis include those with expertise in quantitative as well as qualitative analyses;
6. We also recommend that MMS consider funding a study to determine which of the socioeconomic knowledge components should be included in EISs completed by MMS and to assess the most effective processes and procedures for ensuring their inclusion in future EIS efforts. As indicated above, our review of MMS EIS efforts finds that the use of socioeconomic knowledge in EISs is lagging behind that provided by the studies program. Although the inclusion of additional socioeconomic information might only require an administrative mandate, we believe that the limited usage of socioeconomic base knowledge in EISs may involve more complicated dimensions that require more rigorous analyses.

We began by describing in some detail the Leistritz and Murdock (1981) model for social and economic impact assessment. Throughout this review, it has been obvious that attempts to address the effects of oil and gas development in the Gulf of Mexico present a broad range of important problems and complications. Perhaps the most important of these, as we have noted several times, is the virtual absence of a set of well-defined baseline conditions against which impacts can be assessed. Since it is virtually impossible in the Gulf of Mexico OCS Region to describe a set of baseline conditions, it is also difficult to project either baseline or program development changes on that baseline.

A second, and related, complication comes from the difficulties of defining the impact area. Unlike the typical rural community in the western United States that was impacted, and sometimes dramatically, by some form of energy development, it is extremely difficult to delineate an impact area in the Gulf. The development of a new project in deepwater might be served by any of a dozen different communities from any of several of different states. Even identifying the area where project employees reside is complicated by things such as extended work schedules and the tendency of some workers to live significant distances from coast communities. Given such circumstances, the challenges of attributing changes in the communities to OCS-related activities are compounded.

Finally, we hoped to be able to say somewhat more about cumulative impacts from OCS oil and gas development in the Gulf. What we find from reviewing the studies, however, is something more akin to cumulative findings, rather than cumulative impacts. For example, enough work has now been completed that we have substantial information on some of the important economic and related changes in the Gulf that are associated with oil development. On the sociocultural front, we have also gained knowledge of the effects of unusual work conditions and schedules on families and their successes and failures. However, we have been unable to tease out what might ordinarily be referred to as cumulative project impacts. Without baseline, and without clearly differentiated impact areas, this task is extremely challenging. And yet, the communities in the Gulf that service the exploration for and development of oil and gas are significantly changed.

We conclude by emphasizing, again, that much of this change is clearly attributable to changes in the industry itself that we noted at the beginning of this report. Volatility of world oil markets, restructuring of the industry, joint venturing and other risk reducing strategies, and resulting changes in labor markets have contributed to constant change in Gulf communities that are linked to OCS oil and gas development. All of these changes are a result, in one way or another, of the increased pattern of vertical linkages to world markets, to multinational corporations, and to international banking and finance. The outcome is that they have reduced in a very substantial way any control that oil dependent communities in the Gulf now have over the trajectory of their futures—to the extent that their futures remained linked to oil and gas. This is perhaps among the most important conclusions that comes from this review. It also helps to set the stage for the research agenda that lies ahead.

Although these are broad recommendations and conclusions, we believe they are preferable to more specific recommendations and suggestions that would, because of the breadth of Gulf issues and the geographic, economic, demographic, social, and cultural diversity in the Gulf, not be applicable to many areas in the Gulf. If MMS can maintain ongoing OCS Gulf of Mexico socioeconomic modules of studies in the economic and fiscal, demographic and public service, and social and cultural areas noted above, we believe that MMS interests will be well served by such studies as will the interests of local residents and other stakeholders in the Gulf of Mexico Region.





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## APPENDIX A

### MMS STUDIES SELECTED BY MMS FOR REVIEW

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## APPENDIX B

### LIST OF ONGOING GULF OF MEXICO REGION MMS SOCIOECONOMIC STUDIES BY TOPIC

The following studies are not reviewed because they are ongoing or were completed too late for inclusion.

#### **Baselines, area-wide analysis, history.**

History of Offshore Oil Development in Louisiana

*Deepwater Program:* Benefits and Burdens of OCS Deepwater Activities on Selected Communities and Local Public Institutions

Effects on Local Human Communities of OCS Minerals Extraction in Frontier Areas

Socioeconomic Baseline Gulf of Mexico Region – Phase I

#### **Industry analysis and modeling.**

*Deepwater Program:* Assessing and Monitoring Industry Labor Needs

2002 National IMPLAN User's Conference

Changing Patterns of Ownership, Control, and Access to Global Resources in the Petroleum Industry: Implications for Leasing and Development in the Gulf

An Analysis of the Effects of Crude Oil Price Movements and Instability on OCS Development Activities and the Economic Performance of the U.S. Coastal Gulf States

Modeling Platform Installations and Removals by Water Depths and Planning Areas

Profitability of Offshore Petroleum Ventures and Operations: Empirical Evidence from O&G Lease Sales and Development on the GOM OCS, 1983-1998

Capital Investment Decision Making and Trends: Implications on Petroleum Resource Development in the U.S. Gulf of Mexico

Economic Effects of Changes in Oil and Gas Prices and Petroleum Resource Development in Onshore Louisiana and State Offshore Waters

#### **Infrastructure.**

*Deepwater Program:* OCS-Related Infrastructure in the Gulf of Mexico

*Deepwater Program:* Supply Logistics of OCS Oil and Gas Development in the Gulf of Mexico-Evaluation of Technological and Economic Parameters of Ports as Supply and Manufacturing Bases

**Demography.**

*Deepwater Program:* An Analysis of the Socioeconomic Effects of OCS-Activities on Ports and Surrounding Areas in the Gulf of Mexico Region

Commuting, Migration, and Offshore Oil/Gas Extraction

(NOTE: Benefits and Burdens and Frontier Areas also have large demographic components.)

**Community-level and social effects.**

*Deepwater Program:* Labor Migration and the Deepwater Oil Industry

Labor Migration and the Deepwater Oil Industry in Houma

Sustainable Socioeconomic Development in Oil and Gas Country: A Case Study of Abbeville, Louisiana

Labor Demand in the Offshore Oil and Gas Industry: The Louisiana Case

The Coastal Division of Industrial Labor Over Time and Space

Oil and Gas Involved Areas Along the U.S. Gulf Coast: Evidence from Public Sources and Non-Public Population and Economic Censuses

Job Loss and Re-employment of Marginal Groups in the Gulf of Mexico Region

The Relationship of Crime to Oil Development in the Coastal Regions of Louisiana

Environmental Justice Considerations in Lafourche Parish, Louisiana



### The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.



### The Minerals Management Service Mission

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS **Minerals Revenue Management** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.